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Technology Enhanced Learning Environments within Physical Education Teacher Education: Application of Self-Regulated learning and Self-Determination Theory

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Technology Enhanced Learning Environments within Physical Education Teacher Education: Application of Self-Regulated learning and Self-Determination Theory

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Doctor of Philosophy (Education)

Professor Sue Bennett and Dr Dana Perlman

March 13 2019

Certification

I, Fernando Mondaca-Fernandez, declare that this thesis submitted in fulfillment of the requirements for the conferral of award Doctor of Philosophy from the University of Wollongong, is wholly my own work unless otherwise referenced or acknowledged. This document has not been submitted for qualifications at any other academic institution.

Fernando Mondaca-Fernandez

March 13 2019

Abstract

The implementation of Technology Enhanced Learning Environments (TELEs) within higher education has been popular over the past two decades (Brown, Kregor, & Williams, 2013). The popularity could be attributed to providing flexibility and distance support to typically marginalized populations (Groff, 2013) and enhancing students' involvement in lessons (Hicks, 2011). However, despite the benefits of TELEs, some issues associated with the design and application must be addressed (Hartnett, 2010): (1) the design principles utilized by instructors (e.g. Professors) within their course(s), (2) support students' use and understanding of Self-Regulated learning strategies for working in a new context like a TELE, and (3) supporting students' motivation to self-regulate in a TELE. The interplay between the concepts is important because each can facilitate the overall quality of learning and teaching within a TELE. As such, this study aims to examine the design, development and implementation of a Technology Enhanced Learning Environment within a Physical Education Teacher Education program; and with that to extend the research on TELEs by addressing the lack of inquiry around online education within Physical Education Teacher Education (PETE).

To examine the aforementioned research aim, this study was grounded in a hybrid of Self-Regulated learning (SRL) (Pintrich, 1999) and Self-Determination Theory (SDT) (Deci & Ryan, 1985). For the purpose of this study, both theoretical frameworks were used to examine the design and implementation of a TELE within a Physical Education Teachers Education (PETE) because these theories provide a framework for understanding the motivation, behaviours and experiences of both students and teachers Investigation of the design, implementation and evaluation of the TELE in PETE was conducted using a Design-Based Research (DBR) methodology, also called Design-Based Methodology (DBM); a viable research approach to achieve the blending of theory and practice within a dynamic teaching and learning environment (Reeves, Herrington, & Oliver, 2004).

Participant data were collected using both qualitative and quantitative methods across four distinct phases: design, implementation and evaluation of the TELE. Data were collected using questionnaires, interviews and focus groups with professors who taught the subject, students and academic/administrative staff within the university. Furthermore, researcher field notes were

conducted during the interviews and focus groups. All those data collection tools helped to ensure the rigor of the study through trustworthiness strategies such as triangulation. Further coding and summarizing were used on the completed data set to identify themes and patterns. The analysis of questionnaire data was conducted using Excel for descriptive statistics. Descriptive statistics allowed for a more robust and detailed picture to be illustrated within the particular phase of the study were such data were collected.

The findings from this study seem to support the effectiveness of using SDT and SRL for designing a TELE in a PETE program, however, the reality of their application, demonstrates the complex process to reach not only a functional design for a TELE in this academic environment, but an effective application. At first students, professors and staff expressed positive views that using a TELE in PETE could be beneficial, however, both students and professors showed a lack of understanding about aspects of Self-Determination and Self-Regulated learning. Overall, students, professors and staff did engage with the TELE in the PETE's program in a superficial manner. Finally, even though faculty within this specific university was working according to an educative environment promoting Self-Regulation, this study revealed how organizational culture may impact the design and application of TELEs, both in Physical Education and general higher education. This finding provided support for future research on this Faculty's educational context and current academic model's supporting the application of TELEs.

The study as such, provides an initial inquiry into the implications of the implementation of online education within a practical movement-based subject, such as those common in the study of PE. Specifically, this study contributes to and extends the body of knowledge around SRL and SDT within an online educational setting. Finally, this study will assist in understanding the elements of design principles that could be used as a base for future designs and implementations of TELEs, specially with areas and subjects traditionally relying on practical activities, as PE; as well as within other higher education settings more generally.

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Table of Contents

List of Figures

List of Tables

Chapter One: Introduction

1.1 Introduction

Today's universities, especially public ones, are subject to the educative and political agendas of governments (Torres, 2013; Spring, 2014) and intergovernmental organizations like the United Nations (UN). One specific project is to bring quality education for everyone (UN, 2018). Education is the foundation for the UN's Sustainable Development Goals (SDG) which is a worldwide project to promote prosperity while protecting the planet (UN, 2018). Nevertheless, according to the United Nations Educational, Scientific and Cultural Organization (UNESCO) mass education with quality must be provided not just in every level (e.g. elementary, higher education) but delivered in varied settings and contexts (e.g. online and physical education) (UNESCO, 2016).

A common practice to ensure quality mass education is to ensure a constant economic expenditure that can facilitate the development of physical spaces and cover administrative issues (Jackson, Johnson & Persico, 2016). However, even though providing economic support showed to improve students' outcomes, the concept of quality was not sustained (Baker, 2016).

Within higher education, research stated that quality in mass education could be a problem (Marginson, 2016) because a combination in the decrease from state funding and higher operational costs (CEI, n.d.). A plausible way forward that is currently being implemented for Higher Education Institutions trying to achieve that goal of mass education with quality is Online Education (Sun & Chen, 2016). Online educational environments may provide answers and progress by addressing the issues of (a) accepting more students without spending more money to the creation of physical spaces, (b) supporting the quality of student learning, and (c) allowing greater access for a student population that is not able to attend traditional face-to-face modes of education. While online education can be a broad and varied concept, an approach toward providing a high-quality educational experience that addresses space, access and quality concerns could be Technology Enhanced Learning Environments (TELEs) (University of Wollongong Technology Enhanced and Open Learning Task and Finish Group, 2014).

México, following those guidelines, is working to provide access to a free and mandatory basic education (i.e. primary, lower and upper secondary) by the end of 2020 (Secretariat of Public Education (SPE), 2017). However, as stated, educational access will require more economic and human resources, which could be a difficult task as evident in the 2016 economic obstacles created by an uneven political government (Magaziner & Monroy, 2016). Even though Mexico's public expenditure on education in 2011 was more than 20% of its total public expenditure, and almost double the Organization for Economic Co-operation and Development (OECD) average (12.9% compared to 6.3%) there were still "challenges for transparent and equitable funding of students and schools" (OECD, 2016, p4).

The potential impact of "total access" may also influence the quality of educational rigor and integrity at the university level. One aspect to be aware of is the diversity of educative norms and services across Mexico's states and organizations (Pont, Toledo, Zapata, Albiser & Fraccola, 2013). In support of the aforementioned claims, Urrieta (2014) suggested:

> There is no single quality assurance agency, nor a single national higher education entity, and the quality of the different higher education subsystems can vary drastically. There is also no national comprehensive credit system or national qualification framework. All this lack of regulated and mandatory accreditation and consistency in programming makes the Mexican higher education system complex and complicated. (p. 2)

Also, in 2011, the Mexican state of Chihuahua adopted the "massification" of education whereby Chihuahua´s governor said that a guaranteed place in higher education is available to anyone who demands it (Duarte, 2011). While university for everyone can be viewed an ideal goal, there are some overarching impacts that could occur. Accepting all students could be a challenge since universities must ensure (a) a strong level of student retention, (b) high educative quality standards and (c) an understanding that university qualifications are not a guarantee of an enhanced labor market (Pont et al., 2013). Furthermore, each university must access students in remote locations and/or with physical limitations who may not have had access to university facilities. As a result, university faculties must address policy and practice to balance quantity (e.g. access) and quality (e.g., educational standards).

For that, following those international guidelines and trying to cover those possible impacts from education's massification, Mexico's Autonomous University of Chihuahua (AUCh) is under the project of implementing a TELE in a very specific program as Physical Education Teacher Education (PETE).

1.2 Background to the Study

Technology Enhanced Learning Environments (TELEs) encompass both virtual (e.g. university learning platforms) and physical (e.g. computer laboratories) learning environments through the infusion and application of relevant technologies (JISC, 2014). Research on the use of TELEs has demonstrated their potential to allow for the massification of education, while ensuring the quality that fosters important educative benefits, such as student Self-Regulated learning (Dettori, Giannetti, Persico, 2005; Trigano, 2006; Carneiro, Lefrere, Steffens, Underwood, 2011) and the potential to help people who may fail or have been failed in traditional education (Groff, 2013). Therefore, it is not surprising that TELEs, especially in higher education, have become popular over the past two decades (Brown et. al., 2013). The use of SRL is imperative as previous research illustrates a strong relationship between SRL (e.g. students needing to develop individual regulation) and working in online settings such as TELEs. However, despite the potential benefits, specific educative areas such as Physical Education (PE) have been resistant to the adoption and implementation of TELEs. A major belief and perception about PE and Physical Education Teacher Education (PETE) is that these subjects need to rely on face-to-face interactions because of the focus on physical activity and the need to demonstrate movement, thus online education and technology in PE are not conducive to this option for teaching and learning. However, technological advances may lend themselves to greater relevance in the PE and physical activity space.

Technologies have been identified as being influential for sporting performance and physical activity via interactive video games (Murphy, 2009; Rosen et al., 2014; Rowland et al., 2015; Gao, Chen, Pasco & Pope, 2015) and enhancing the accuracy of biological and physiological measurement such as heart rate and caloric expenditure (Strath, Brage, and Ekelund 2005). Researchers have proposed that technology (i.e., video games) "offers us a range of tools, not

just for promoting certain behaviors, but also for studying the neural bases of learning and development" (Bavelier, Green & Dye, 2010, p. 1). Furthermore, the Australian Curriculum Assessment and Reporting Authority (ACARA, 2013) suggested that technology can help students in physical education not just to analyze their performance (i.e., movement) but to "enhance movement performances" (p. 20). Hence, as educative politics change, PE faculties may come to view TELEs as an opportunity for innovation and social impact (Amiel & Reeves, 2008), leaving perceptions and beliefs of traditional teaching and learning strategies behind (e.g. PE can be only worked on a face-to-face mode).

In attempting to meet the new educational needs, the Faculty of Physical Culture Science (FPCS) at the Autonomous University of Chihuahua (AUCh) is looking into the challenge of delivering an online PETE subject. TELEs have been identified as a viable option as they strongly align with an aim of the faculty's academic model to develop self-regulated students (AUCh, 2008, Dettori & Persico, 2010) and provide an enhanced flexibility in meeting the diverse needs of students. As for this research and following JISC's definition (2014) the FPCS' TELE (Figure 1) components were:

1. - The University Online Learning Platform: Moodle.

2. - Professors and students' communication devices and platforms: Laptop, mobile phone and WhatsApp and Facebook.

3. - FPCS' physical face-to-face infrastructure: Sports facilities, classrooms and PC's laboratories.

4. - Students own physical infrastructure: Home and work places.
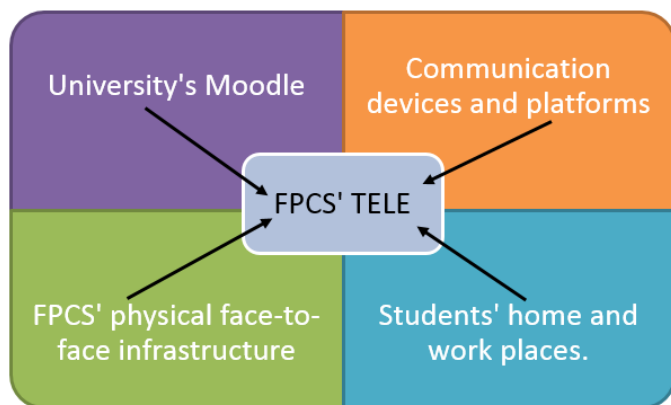
Figure 1: Components of FPCS' TELE.

However, as effective as TELEs conceptually seem to be, faculties with limited background/experience and research in online education, as FPCS, question whether they should use TELEs, what issues they might face in the effective use of TELEs in PE, and whether a TELE is effective in movement-based settings such as in PE. Besides that, faculties must face how their own organizational culture issues, a complex construct of perceived common practices only experienced by the faculty's inside actors (Somprach, Prasertcharoensuk & Ngang, 2015) could affect the effective design and application of any educative innovation, including TELEs (Martins & Terblanche, 2003). Research (Hill, 1988; Means et al., 2010; Casanova et al., 2011) indicate that changes in the instructional approach for using a TELE could be a radical challenge for institutions' organizational culture, even affecting the educative process. Even more, some researchers consider adopting innovation an output of organizational culture (Drent & Meelissen, 2008). From that, faculties must create plans to the management of those organization's cultures factors, that could affect professors' perceptions and reactions to the implementation of technology-enhanced innovation (Zhu, 2015).

Finally, literature highlights overarching concepts needed to achieve a successful implementation of TELEs: 1) the effective pedagogical principles that professors/instructors will use in the design and application of their TELEs (JISC, 2014; Parker, 2011); 2) the Self-Regulated learning strategies students need to work in a new technology-enhanced context (Johnson & Davies, 2014); and 3) the motivation students need in order to use TELEs (Veiga, Cruz & Costa, 2008; Zao & Johnson, 2012). The construct of student motivation is important because it facilitates whether a person will be Self-Regulated, and in turn use effective learning strategies (Deci & Flaste, 1995; Pintrich, 1999). Those TELE concepts provide the theoretical and conceptual basis for this study and are explored in more detail in chapters two and three of this thesis.

1.3 The Significance of the Research

This research addresses a significant educational issue, which is how universities can begin to bring mass education while maintaining quality standards. As noted above this is a challenge for Mexican higher education, but one that exists around the world as many countries seek to make education more available to all citizens (OECD, 1998; Hood, James, Peters & Scott, 2005: European Comission, 2009; Lomas, 2002; Pitman, 2014). The AUCh trying to answer that

challenge implemented online education as an alternative to traditional education (AUCh, 2011). However, those first attempts to online education didn't considered the whole factors acting on this process (e.g. students, professors, staff and physical spaces) something that TELEs did. Also, TELEs have been identified as a viable option as they strongly align with an aim of the faculty's academic model to develop self-regulated students (AUCh, 2008, Dettori & Persico, 2010) and provide an enhanced flexibility in meeting the diverse needs of students. Finally, there is a pattern of TELEs being used mainly in theoretical fields with limited examination and usage in there is a pattern of TELEs practical studies (e.g. Sport and Physical Education). A plausible reason for the lack of PE grounded TELEs could be attributed to the traditional perceptions that movement-based areas of education require physical activity that needs to be observed in real time by the teacher (Paechter & Maier, 2010; Kemp & Grieve, 2014). This means that TELEs are not being utilized across the breadth of educational setting (Wedman & Diggs, 2001; Attwell & Hughes, 2010; Groff, 2013) which places a limitation on access and involvement for some students who are interested in specific subjects/degrees (Groff, 2013; Hicks, 2011), such as PE.

This study is significant because:

1) There has been limited inquiry into online education within PETE. As such, this study will provide an initial inquiry into the effectiveness of online education within a movement-based subject. Findings from this study could help extend and grow the understanding and application of online education within the PE pedagogy (Murphy, 2009) and physical activity fields (Strath, Brage, & Ekelund 2005; Bavelier et al., 2010). Also, it focuses on Physical education (PE) and Physical activity, while previously it mentions PETE because there is little research directly linked to the area to research (PETE). Form that and following the advice from researchers I "identify literature relevant to the foundational theory of the project, even though the link may be indirect" (Richey et. al., 2003, pg. 1115).

2) This study will contribute to and extend the body of knowledge around Self-Determination Theory (SDT) and Self-Regulated learning (SRL) theories within an online educational setting. SRL has been used in online learning research previously, but there has been limited application of SDT. There has been a wealth of research that has examined teaching and learning using SDT and SRL seperately, yet Vanasupa, Stolk and

Harding (2010) have suggested a clear need to conduct educational research using a hybrid model that draws together both. By drawing upon these two theories together in the same study, this research will contribute new insights into how the concepts they contain relate and can be used together.

3) This study will assist in understanding the design principles that could be used as a base for future designs and implementations of TELEs in other settings in higher education. The findings from this study will be relevant to PE and other educational settings that use a more real-life and observational pedagogies such as within the field of nursing. There are also aspects of the faculty and institutional context that will be relevant for other faculties, universities and countries wishing to adopt online approaches (Wedman and Diggs, 2001).

1.4 Purpose of the Study

The purpose of this study was to examine the design, development and implementation of a Technology Enhanced Learning Environment within a Physical Education Teacher Education program. As part of this research, the study aimed to identify design principles useful for other programs and to develop an understanding of the process of introducing TELEs as a new approach to teaching and learning.

1.4.1 Research Questions

Specifically, this study was guided by the following questions:

1. How can Self-Determination Theory and Self-Regulated learning be applied to design an effective Technology Enhanced Learning Environment (TELE) in Physical Education Teacher Education (PETE)?
2. How do students, professors and university staff engage with a TELE in PETE?
3. How does the organizational culture affect the effective design and application of a TELE?

1.5 Research Design

To address the aforementioned constructs of student learning strategies and motivation, Self-Determination Theory (SDT; Deci & Ryan, 1985) and Self-Regulated learning (SRL; Pintrich, 2000) offer theoretical frameworks for the creation and implementation of TELEs in higher education (Dettori et al., 2005; Artino & Stephens, 2009; Chen & Jang, 2010; Rakes & Dunn, 2010; Bachman & Stewart, 2011; Yamada, Goda, Matsuda, Kato & Miyagawa, 2015; Noour & Hubbard, 2015; Somayeh & Takeshi, 2017). However, theoretical design and research are separated from the complex reality of teaching-learning settings, hence final applications often have "little direct influence on practice" (Wang & Hannafin, 2005, pg. 6). To address this problem, the research approach must involve the practitioners in the actual context to give a realistic and practical solution, grounded in a sound theoretical and conceptual framework. Design-Based Research (DBR) was chosen as the research methodology because it has been identified as a viable research approach to achieve the blending of theory and practice because of its focus on the following principles (Reeves, Herrington & Oliver, 2004):

- Addressing complex problems in real contexts in collaboration with practitioners.
- Integrating known and hypothetical design principles with technological affordances to render plausible solutions to these complex problems; and
- Conducting rigorous and reflective inquiry to test and refine innovative learning environments as well as to define new design principles. (p. 7)

This study used SRL and SDT as theoretical frameworks within a four-phase DBR approach with a goal to understand the multi-faceted elements that influenced the implementation of a TELE within a PETE subject. This study occurred over four distinct phases.

Phase One (Analysis) – The intent of Phase One was to create and trial a pilot online Moodle's Subject (MS) to support the TELE. During this phase, the MS was developed using the University's Moodle and an external platform (YouTube) as the provider to upload the videos. Furthermore, an initial data collection questionnaire about perceptions of online education and the possibilities of using it in a PETE program was developed and tried with 65 professors and 65 students. All 130 participants expressed interest in participating further in the research by leaving their contact details (e.g., telephone number, email, student number) and were contacted

for further participation. As a result, 9 professors and 24 students accepted to being interviewed during this phase and to participating in focus groups in order to collect information about the learning and teaching principles that were used and could be used in their classes. Students were mostly part of the same group the previous semester working on the subject gymnastics 1. In addition, they knew the professor already, because were their students on that class, or participate together in the final gymnastics presentations, were all work together in a final presentation. Finally, to create the focus groups students themselves create those groups with other students with similar schedules, to facilitate the meeting. That level of interaction students-students and students-professor, allow to create better conditions for social relations, and with that help to the support between colleagues. An Expert Group was established to support the research, and in this phase particularly advised on the technological and pedagogical elements needed to implement the TELE.

Phase Two (Design) – This phase was focused on the development and first evaluation of the MS. A special adaptation of Gymnastics 2, a subject previously taught face-to-face, was developed as an online subject to initially test the TELE. Within that online subject, students were able to have access to documents, didactical videos, and tools to help them to work through the tasks as personal chats and a schedule tool. A proposed schedule tool was created with *Lessons* (a Moodle's tool) (Figure 2) and following Pintrich's Self-Regulation Model (2000): Forethought; Monitoring; Control and Reaction. The aim was to design an automatic prompts based tool that guide students to work in every task through the Self-Regulation strategies. The student will receive a copy of that process, could start it any time that they decide to and will receive help to control the task depending on the student's needs. Table 1 presents definitions of each stage and their application on this study via the schedule tool.

Stage	Definition	Application of SR's stages on this study via the schedule tool's steps
Forethought	This phase includes identifying goals, accepting and directing the determined goals, planning time and space, determining the perceptions about the tasks, and determining the motivational effects.	Students determined their aware of likely to finish the online course accepting to identify goals and making a plan (step 1).
Monitoring	At this stage, an individual understands his/her own cognitive awareness, an awareness of one's time and the need for help, as well as the awareness of the task and the task related	Also determined their perceptions about the task's difficulty (step 2) and planning time and effort (step 5) helps with the monitoring stage.
Control	At this stage, an individual has chosen and implemented appropriate learning strategies for thinking; it is the moment when the motivational strategies are selected and applied.	Steps 3, 4 and 5 allowed students to be aware of their own time's use. Steps 6 and 7 students showed to be aware of their possible need for help.
Reaction	This is the stage when individuals make cognitive judgments and evaluations regarding; showing effective reaction, insistence, giving up, choice making, and evaluating content. It is the time when s/he evaluates her/his task. In short, it is the time that the individual assesses himself/herself about whether there is a difference between the target and the performance he/she has demonstrated in the beginning.	Finally, on step 4 students practice prior content knowledge activation identifying what they already used on similar tasks that could be of help to reach the goal.

Table 1: Application of SR's stages on this study via the schedule tool's steps. Created from Çetin (2017)

Figure 2: Proposed automatic prompts-based schedule tool.

Students used that online subject to first learn via videos and text about pedagogical ways to teach a gymnastic movement; and later to send the documents and links to videos that demonstrated their performance on the required tasks. Finally, if the online help provided was not enough for students, they were able to use the technology (e.g., WhatsApp's video call) to make live video calls to the instructor to watch him in real time teaching the gymnastics movements with a classroom group. Using the university's institutional Moodle system, students engaged in the first version of the MS (Version 0). During this phase, 11 students from the original 24 in Phase One and 9 professors were asked to provide suggestions for refinements and/or changes that would enhance the overall educational experience and relevance of the TELE. This data was collected using focus group interviews and was used to create the next version of the MS (Version 1). In addition, participants were asked for their thoughts about the learning processes needed in the TELE and how those learning processes could be used in both academic and non-academic settings. This information was presented and utilized by the Expert Group, which consisted of six participants from different areas within the university, to assist in developing the final version of the MS for use in the remaining phases. That process covers two strategies to ensure the rigor of the study: utilize multiple sources to collect data (e.g. triangulation) and discussions with supervisors about the data collected (e.g. peer review) (See Table 2 for a full list of strategies to ensure the rigor in the conduct of the study). The make-up of and unique skill-set/contribution of each member of the Expert Group consisted of the following areas of expertise:

- Expert 1 - Creation and application of questionnaires
- Expert 2 - Creation and conduct of focus group and personal interviews
- Expert 3 - Didactics and evaluation of physical education and president of the Mexican Council for the Accreditation of the Teaching of the Culture of Physical Activity (COMACAF)
- Expert 4 - Pedagogy of physical education
- Expert 5 - Head of linking with sectors department (from Chihuahua State Secretariat of Education, Culture and Sports)
- Expert 6 - Use of technologies in educative platforms (e.g. Moodle)

- Expert Panel 1 - Seven associate professors within the faculty helping with the organizational issues regarding the possible implementation of a new educative strategy (e.g. adapting the traditional evaluations' schedule to the TELE).

The Expert Group was recruited from professors who indicated they wanted to work on the solution of the practical problem (i.e., the design of the TELE). Members of this group worked with the researcher to utilize the design principles from literature, principles of their own and covering issues related with the design and application of technologies in education (e.g., Oliver, 1999; Agostinho, Bennett, Lockyer & Harper, 2003). The researcher related their ideas to the elements within the literature review of online education. Those professors included experts in pedagogy; use of technologies on the design of a TELE; creation of questionnaires and application of interviews, and didactics and pedagogy of the Physical Education Expert Support Group. This expert group assisted in two ways. The first was ensuring the quality of the study with a peer review with the expert group, colleagues and with supervisors allowing for a congruency in the emerging findings with the raw data and tentative interpretations. As a note, the president of the Mexican Council for the Accreditation of the Teaching of the Culture of Physical Activity (COMACAF by its Spanish acronym) (i.e., Expert #3) identified the importance of this project as a feasibility study that was relevant and needed for the future of PETE. The second was to assist the researcher in clarifying roles such as designer, advisor and facilitator. These roles are in line with the rigor and responsibility of a design-based research (Herrington et al., 2007).

Phase Three (Implementation) – This phase was focused on the evaluation and implementation of the final version of the Gymnastics 2 MS in an authentic educational setting. Data were collected using both quantitative and qualitative measures from the nine students and the professor who were engaged in the class. Quantitative data were collected at the beginning and end of the implementation and obtained from the Moodle site through the data log of how many times students logged into the site, time spent, and resources used. Qualitative data were collected through Personal Interviews which were conducted with students and weekly interviews with the professor throughout the entire FCPS' TELE.

Phase Four (Reflections) – This phase was conducted as a review of findings to identify design principles and evaluate the TELE overall. Participant data were collected using qualitative methods (e.g., Personal Interviews). The information obtained from this phase was focused on understanding the dynamic and organic nature that influenced the TELE and provide recommendations for future consideration. To ensure that the findings accurately represented the participant cohort, findings were discussed with students, professors and the expert group to assist with interpretation. That was part of the quality ensuring' strategies as member check and peer review (See Table 2 for a full list of strategies to ensure the rigor in the conduct of the study).

1.5.1 Data Analysis Overview

Data analysis began from the initial discussions with study participants. Data analysis used a variety of qualitative and quantitative techniques throughout the multi-phased Design-Based Research Methodology. Qualitative data were collected using a variety of interviews, focus groups and researcher field notes depending on the phase of the study. Qualitative data were using a constant comparative method (Strauss & Corbin, 1990). The choice of using the constant comparative method was due to the progressive nature of the study, whereby data/information from each phase could be used to inform future phases. In Phases One and Two, qualitative data were coded using participants' own words with findings used to create a preliminary classification of the data. In addition, the lead researcher compiled field notes by recording descriptions of the participants and settings to support interpretation of their ideas. Most of the researcher field notes were made during the interviews and focus groups. That process was part of the triangulation and thick description's strategies utilizing multiple sources of data collecting, as focus groups and field notes, and providing enough description to contextualize the study and with that keep the rigor on the study.

Further coding and summarizing were used on the complete data set to identify themes and patterns. Quantitative data from questionnaires were organized in Excel for management and analysis. The analysis of questionnaire data was conducted using descriptive statistics, such as frequencies and percentages. Descriptive statistics allowed for a more robust and detailed picture to be developed within the particular phase of the study. In every phase the data was presented

for interpretation not only to the same participants, but also to the expert group to help the researcher to understand and enrich the initial ideas that the data brings. This was particularly the case in Phase Four, where some ideas were new or complex, and the experts helped to interpret and create categories and definitions for those ideas in order to understand it in a more complete way.

1.6 Definitions

This section provides definitions for some of the terms used in this study.

Academic Model: Plans and study programs that supports the academic aim of an Educative Institution (AUCh, 2017).

Amotivation: The complete lack of motivation to act on or pursue an activity (Deci & Ryan 2000).

Autonomous University of Chihuahua (AUCh): A Mexican public university based in the city of Chihuahua, Chihuahua, but with several campuses across the state and comprised of 17 academic units (faculties).

AUCh's Academic Model by competences: An Academic Model focused on learning that emphasizes the constructive development of skills, knowledge and attitudes that allow students to fit appropriately into the work structure and solve social problems. In this mode, the learner has a critical and reflective attitude to be considered the manager of his or her learning and the professor is a facilitator of learning environments (i.e., context) that foster students' self-determination and self-regulation.

Autonomy: "refers to the experience of behavior as volitional and reflectively self-endorsed" (Niemiec & Ryan, 2009, p. 135).

Basic University subjects: Four basic subjects that all AUCh students must cover and can be taken with the professor and in the Faculty that the student decides, even if it is not in their particular Faculty. In addition, beginning in 2018, the four subjects could be taken in a blended modality with in-person and online supported components.

Blended learning: "approaches, in which in-person and online course components are combined in a single course" (Kiviniemi, 2014, p. 1).

CECAD (by its Spanish acronym): Technological and Systems' Staff from the Autonomous University of Chihuahua.

Chihuahua: A Mexican state bordering the United States of America.

COMACAF (by its Spanish acronym)*:* Mexican Council for the Accreditation of the Teaching of the Culture of Physical Activity, a. c.

Competence (SDT): "sense of effective interaction with the environment" (Niemiec & Ryan, 2000, p. 3).

Competences (AUCh): skills, knowledge and attitudes that allow students to fit appropriately into the work structure and solve social problems (Marín, 2003).

Design Principles: "Recommendations for designs that enable teachers and instructional designers to use well-researched ideas as guidelines for their own efforts to enhance student engagement and learning outcomes" (Herrington & Reeves, 2011).

Design‑Based Research: A "systematic but flexible methodology aimed to improve educational practices through iterative analysis, design, development and implementation, based on collaboration among researchers and practitioners in real-world settings and leading to contextually-sensitive design principles and theories" (Wang and Hannafin, 2005; pg. 6).

*Effort regulation: "*Students' ability to manage their attention-avoiding study conditions" that need "expending extra effort in order to fulfill predetermined academic goals" (Bembenutty, 2011, p. 59).

Epistemology: The study or a theory of the nature and grounds of knowledge especially with reference to its limits and validity (Merriam-Webster, 2017).

Faculty of Physical Culture Science (FPCS): An AUCh Faculty with fields of study of Physical Education, Sports and Human Kinetics.

Motivation: "A subjective, privately experienced condition that energizes and directs students' action" (Lee & Reeve, 2012, p. 730).

Ontology: A particular theory about the nature of being or the kinds of things that have existence (Merriam-Webster, 2017).

Organisation for Economic Co-operation and Development (OECD): An organisation with the mission to promote policies that will improve the economic and social well-being of people around the world (OECD, 2017).

Organizational Culture: A regular element and a complex construct of perceived common practices, "only completely experienced by insiders"; that drive today's educational institutions (Somprach et al., 2015).

Participatory Design: A design practice where users contribute with the development of designs trough all stages of development, and not just on the final moment or just providing feedback on completed technologies (Driscoll, Brizee, Salvo, & Sousa, 2008).

Pedagogical models: "Cognitive models or theoretical constructs derived from learning theory that enable the implementation of specific instructional and learning strategies" (Yang & Yuen, 2009, p. 453)

Physical culture (physical education): "Physical Education is a process of Education both through formal and non-formal means" (FIEP, 2000, para. 2), "aiming at learning and developing motor skills of children, youngsters, adults and senior citizens by increasing their personal conditions for the acquisition of knowledge and favorable attitudes for the consolidation of systematic habits of Physical practice" (FIEP, 2000, para. 5).

Physical Education Teachers Education program (PETE): A graduate program with students that demonstrate to be physically literate with skillful performance in physical education content areas and health-enhancing levels of fitness, showing an understanding of common and specialized content; use of pedagogical skills, and scientific and theoretical foundations for the delivery of an effective preK-12 physical education program (SHAPE America, 2017).

Physical Education/ Physical Culture and Sports: A graduate program that explores sport and exercise through a humanities/social science approach (UTA, 2017).

Public University in Mexico: A fully government funded University.

Qualitative case study approach: "a case study is an empirical inquiry that investigates a contemporary phenomenon within its real-life context, especially when the boundaries between

phenomenon and context are not clearly evident, and will be many variables and multiple sources of evidence" (Yin, 2014; p.18).

*Qualitative Research***:** A research approach "of specific relevance to the study of social relations" (Flick, 2009, pg. 12) that wants to know what the world means for people in a particular point in time (Merriman, 2002, pg. 114) providing information about intangible factors (e.g., social norms, socioeconomic status, gender roles and ethnicity) (Mack, Woodsong, Macqueen, Guest & Namey, 2005).

Relatedness: "is deeply associated with a student feeling that the teacher genuinely likes, respects, and values him or her" (Niemiec & Ryan, 2009, p. 139).

Rubric: "a coherent set of criteria for students' work that includes descriptions of levels of performance quality on the criteria" (Brookhart, 2013, p. 4).

Secretariat of Public Education (SPE): A federal government authority responsible for the development and implementation of Public Education in México.

Self-Regulation Skills: "A controlled, cognitive monitoring of the actions and steps required to obtain a goal or to bring about a desired response from the environment" (Blair, 2003, p. 1).

Self-Determination Theory (*SDT*): A theory studying human motivation that may provide a sound framework to examine the dynamic process between the people and the environment (Deci & Ryan, 1985).

Self-Regulated learning: An active, constructive process (Pintrich, 2000) by means of which students can regulate their own cognitive processes (Puustinen & Pulkkinen, 2001).

Technology Enhanced Learning Environments (*TELEs):* "virtual and physical technology enhanced learning environments; incorporating physical learning spaces, institutional virtual learning environments, personalized learning environments and mobile and immersive learning environments" (JISC, 2014, pg. 1). However, Dettori and Persico (2010) suggested that in order for an educational setting to be termed a TELE, SRS must be developed by the technology's support.

1.7 Structure of the Thesis

This thesis consists of five chapters. Chapter 1 has provided an overview of the study's research aim; with a review of the background and significance of the research and some definitions needed to follow the process of this research. Chapter 2 will present how this study used SRL and SDT theories to frame the implementation of a TELE with a PETE program, through a review of relevant empirical and theoretical literature. Chapter 3 describes, in detail, the process and instruments utilized to collect and analyze the data, the participants in the study and the research process. Chapter 4 presents the results of the study directly related to self-determination theory, Self-Regulated learning and the faculty's organizational culture. Finally, Chapter 5, discusses the findings to provide insight into the study's purpose. In addition, the implications for the theoretical and practical elements of this study, limitations, future research and final conclusions are provided.

Chapter Two: Review of Literature

2.1 Introduction

This chapter will begin by discussing both Self-Determination Theory and Self-Regulated learning. Each section introduces the theory, outlines the main theoretical constructs and summarizes relevant research. Furthermore, this chapter will include a (a) synthesis of literature introducing TELEs in higher education and (b) discussion of the design and implementation of TELEs relevant to this study. Finally, a brief conclusion at the end of this chapter will bring together the key ideas and identified the gap and approach for the study.

2.1.1 Self-Determination Theory

Self-Determination Theory (SDT) is a theory studying human motivation that provides a sound framework to examine the dynamic process between people and the environment that can facilitate educational outcomes (Deci & Ryan, 1985; 2012). Important to note is that SDT focuses not just on the quality of an individual's performance, but on how other social and cultural factors offer support for an individual's initiative and volition (Deci & Ryan, 1985). As such, SDT can provide a valuable lens for examining the connection and association between the pedagogical principles used and the students' behaviors and actions (Deci & Ryan, 2012). SDT has been applied in a diverse range of life domains, such as parenting (Turner, Chandler & Heffer, 2009; Cordeiro, Paixão & Lens, 2015), environmentalism (Webb, Soutar, Mazzarol & Saldaris, 2013; Aitken, Pelletier, & Baxter, 2016), institutional reform (Ryan & La Guardia, 1999; Niemic, & Ryan, 2009), sport (Hagger & Chatzisarantis, 2007; Standage & Ryan, 2012), medicine (Williams, Saizow & Ryan, 1999; Kusurkar, 2012; Lyness, Lurie, Ward, Mooney & Lambert, 2013) and education (Reeve, 2002; Ryan & Deci, 2013; Ratelle, Simard, & Guay, 2013). The wide application and research using SDT illustrates its applicability within diverse research settings, including some initial research focused on virtual teaching and learning settings (Chen & Jang, 2010).

In PE, there has been a wealth of research (over 100 papers) grounded in SDT (Van den Berghe, Vansteenkiste, Cardon, Kirk & Haerens, 2014). Van den Berghe et al. (2014), through a systematic review of SDT research in PE, illustrated the sequential pathway of SDT within PE,

which is provided in Figure 3, and elaborated in the next section. However, that research was specific for the PE class while the present research is focused on a PETE program. It should be noted that the research using SDT in teacher education is focused on either (a) the motivations of teachers to work in higher education and (b) how self-determined pedagogies influence elements of student learning and achievement (Spittle, 2009; Black & Deci, 2000; Tsouloupas & Carson, 2017).

Teacher Focused	Student Focused		
Social Context	Psychological Needs	Motivation	Outcomes in PE and Learning and Teaching
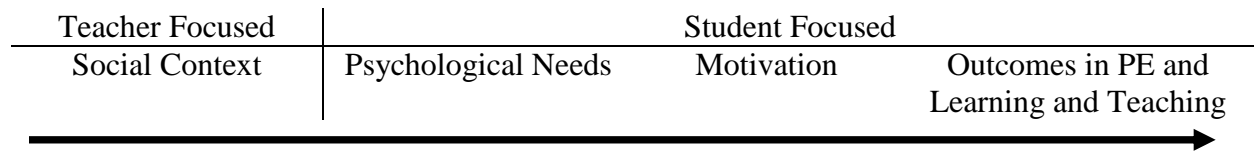
Figure 3: Sequential pathway of SDT within PE.

2.1.2 Elements of Self-Determination Theory

While the multi-faceted elements and constructs of SDT have been researched in PE, the intent of this study is focused on (a) the social context and (b) motivational responses (i.e. psychological needs and self-determination) and (c) outcomes associated and influenced by individual motivation.

Social Context

The social context, according to SDT, is viewed as the social and cultural conditions that promote and facilitate the perceived environment (Ryan, 2009). The social context can be a catalyst that could allow people to be more self-motivated when their basic psychological needs are supported (Deci & Ryan, 1985). As such, any school setting whether face-to-face or online can be perceived as a social context (Lam, Law, Chan, Wong & Zang, 2015). From an SDT social context perspective, there are three concepts that must be understood; (a) autonomy-support, (b) control and (c) structure (Vansteenkiste et al., 2012).

Autonomy-Support and Control

While autonomy-support and control are two separate concepts they are important to discuss together as they both contribute to the overall social context, while the concept of structure is focused more on the aspects that facilitate learning (Collins & Frank, 2013). In educational settings, an autonomy supportive classroom is perceived to provide students with choice and control over their learning (Reeve & Jang, 2006). On the other hand, controlling settings are perceived as restricting the control of students (Reeve, 2009). The development of a social context is typically originated by a person in charge of the setting, which can be viewed as the teacher (Sanders, Wright & Horn, 1997). An autonomy-supportive teacher or instructor utilizes pedagogical strategies that give control and listen to students' voices; that allow students to act under a sense of following their own interests and will (i.e. volition) in order to achieve academic goals (Vaansteenkiste et al., 2012). Furthermore, a supportive teacher will nurture the internal motives of students, be patient when delivering class material, allow enough time for each student and acknowledge when a student is unhappy or emotionally distressed (Reeve, 2009). On the other hand, a controlling teacher will focus more on instructional elements whereby students reproduce information and complete work without necessarily understanding the task (Stefanou, Perencevich, DiCintio & Turner, 2004). Furthermore, teachers will utilize external motivation (e.g. general rewards), be restrictive with time and neglect students when they demonstrate affect that is negative (Reeve, 2009). While autonomy-support and control can be placed at distal ends of a spectrum or continuum, teachers commonly apply both within their educational settings (Amoura et al., 2015). It should be noted that Reeve (2009) suggested that many teachers are more controlling by nature.

Structure

The concept of structure is associated with the instructional elements that guide learning and allow for the educational goals to be achieved (Skinner & Belmont, 1993). Skinner and Belmont (1993) stated that "structure refers to the amount of information in the context about how to effectively achieve desired outcomes; its opposite is chaos" (p. 2). Under a structured educational environment, students will be provided clear goals and an understanding of expectations that will cater for their individual differences (Stefanou et al., 2004). Practical strategies utilized by

teachers in regard to structure are feedback and guidance when necessary in order to achieve the academic aims (Skinner & Belmont, 1993; Carter & Doyle, 2006). On the other hand, in low structure environments teachers fail to communicate expectations and can provide feedback that is contradictory or misaligned with the learning goal(s) (Jang, Reeve & Deci, 2010). While structure is a key construct, there is limited inquiry as much of the literature and evidence is focused on autonomy-support and control (Van den Berghe, et al., 2014). A plausible reason for this could be that the concepts of autonomy-support, control and structure can be confused (Jang, et al., 2010). Specifically, the constructs of control and structure seem to align with being restrictive or controlling, yet they are diverse. This study will separate the concepts (control and structure) by viewing structure as the element needed to guide the learning of students. For instance, providing feedback and telling a student how they may want to complete a task can be controlling in nature, yet may not be when the intent is to guide the learning. Delivery of feedback is different within an online setting where teacher is not able to observe students' non-verbal elements that would require feedback and assistance. That claim supports this research's idea of utilizing a schedule tool. From that, while students could determinate some academic factors as datelines or tools to send tasks; the pathway and sending process of each task was under the schedule guide (structure).

The concept of the social context is important to the motivational and educational outcomes of students (Dupont, Galand, Hospel & Nils, 2014). Depending on the level of autonomy-support created by the teacher, this will influence/support the motivational responses (e.g. psychological needs) of each student (Kiemer, Gröschner, Kunter & Seidel, 2016). Much of the research has revealed that teachers who apply instructional strategies that facilitate an autonomy-supportive setting will produce more positive results for their students (Wang & Eccles, 2013). For instance, autonomy-supportive settings have been aligned with outcomes such as enhanced motivation (Chang, Fukuda, Durham & Little, 2017), academic achievement (Wang, Ng, Liu & Ryan, 2016) and learning (Jang, Reeve & Halusic, 2016). Controlling settings, which are more commonly adopted by teachers, are associated with less desirable learning outcomes (Reeve, 2006). The concept of structure is under researched when compared with support and control, yet the literature supports the notion that structure and autonomy-support can be valuable to the learning of students (Jang et al., 2010).

Motivational Responses

The motivational responses housed under SDT are (a) psychological needs and (b) self-determination. Psychological needs are inherent constructs that each individual possesses that facilitate an individual's self-determination (Deci & Ryan, 1985). Self-determination is viewed as the internal desire or motivation that a person possesses within diverse settings (Deci & Ryan, 1985). According to SDT literature, the support for a person's psychological needs will influence their self-determination (Ryan & Deci, 2000).

Psychological Needs

SDT espouses three key psychological needs called autonomy, competence and relatedness (Deci & Ryan, 1985). Autonomy "refers to the experience of behavior as volitional and reflectively self-endorsed" (Niemiec & Ryan, 2009, p. 135). A student will feel supported in their need for autonomy when they are provided choice and/or control in a learning task, as well as, being provided opportunities to make relevant educational decisions (Adie, Duda & Ntounamis, 2008). Competence refers to a "sense of effective interaction with the environment" (Niemiec, Soenens & Vansteenkiste, p. 3). Being supported in the need for competence can be two-fold. First, a student may judge his/her success or accomplishment in a social manner. This means that success is focused on scoring higher when compared with their peers (Miserandino, 1996; Schutte et al., 2017). Second, a student may be focused on personal growth and/or development. Their perception of competence support is when they feel some level of educational growth, irrespective of what others think or how they have done (Niemiec & Ryan, 2009). Relatedness "is deeply associated with a student feeling that the teacher genuinely likes, respects, and values him or her" (Niemiec, et al., p. 139). Relatedness support can be achieved when a student is cared for (e.g. provided empathy) and/or allowed for their voice or opinion to be heard in class (Baumeister & Leary, 1995).

Ntoumanis, Pensgaard, Martin and Pipe (2004) stated the importance of implementing experiences which support all three needs. Supporting the psychological needs of students is imperative, as this will in turn, facilitate higher levels of self-determination and associated experiences and behaviours that benefit the learner (Deci & Ryan, 2000). Deci and Ryan (1985)

stated that supporting needs both individually and collectively are important to the individual. Support for this claim is evident in previous literature whereby support for these needs have facilitated higher levels of well-being (Sheldon & Niemiec, 2006), social experiences (Niemiec, Soenens & Vansteenkiste, 2014); physical activity (Sheldon & Filak, 2008) and life satisfaction (Leversen, Danielsen, Birkeland, & Samdal, 2012).

Self-Determination

Self-determination is a concept whereby an individual is motivated to engage or be involved (Deci & Ryan, 1985). Self-determination can occur at different levels for a student and are typically associated with motivational levels (Koestner & Losier, 2002). These overarching levels are intrinsic, extrinsic and amotivation (Vallerand & Bissonnette, 1992). Intrinsic motivation is aligned with behaviors that are done for internal reasons (Deci & Ryan, 1985). Internal reasons are aligned with concepts such as enjoyment, experience, accomplishing a task and/or internally important/relevant (Baker, 2004). Extrinsic motivation is associated with the desire to engage or be involved for reasons that are external (Ryan & Deci, 2000). External factors are associated with gaining a tangible reward, being told it is important and/or guilt (Baker, 2004). Amotivation is a motivational level that is associated with a lack and/or desire to engage (Deci & Ryan, 2000). Students who are amotivated will be likely to not engage or spend a considerable amount of time creating excuses/reasons not to be involved (Ntoumanis et al., 2004).

High levels of self-determination are aligned with intrinsic motivation, while low self-determination is related to amotivation (Ntoumanis, 2002). Intrinsically motivated or self-determined students have been linked with positive student outcomes such as higher educational aspirations (Niehaus, Rudasill & Adelson, 2012), improved academic performance (Ayub, 2010), goal pursuit (Burton, Lydon, D'Alessandro & Koestner, 2006) learning (Niemiec & Ryan, 2009) and performance in physical activity (Murcia, González-Cutre & Ruiz, 2009). On the contrary, low levels of self-determination is associated with students who tend to be absent, late for class and do not engage in the learning activities (Ntoumanis et al., 2004).

2.1.3 Relevant Applications of Self-determination Theory

As noted above, SDT has been an important theory in PE research. Specifically, research has been focused on a variety of the aforementioned constructs (e.g. social context, psychological needs, self-determination) by trying to understand each both individually and collectively. Social context research has been focused on elements of the educational setting that facilitate positive student experiences. Perlman (2013) found that the social context can facilitate different levels of in-class physical activity. Furthermore, studies support the idea of social context facilitating student motivation (Taylor, Ntoumanis & Smith, 2009; Lawman, Wilson, Van Horn, & Zarrett, 2012; Shelton, McNeill, Puleo, Wolin, Emmons, & Bennett, 2011), achievement (Guay & Vallerand, 1996), decreased bullying behaviours (Lam et al., 2014) and female engagement in class experiences (Johnson, Prusak, Pennington & Wilkinson, 2011). It is also important to note that teaching behaviours that facilitate a positive or autonomy-supportive setting can be developed in teachers both within a traditional PE (Perlman, 2013) and adapted PE setting (Perlman & Piletic, 2012). Much of the research on PE using SDT applied strategies have been grounded in the collective works of Reeve and his colleagues (Reeve, 2002; 2006; 2009; Reeve & Jang, 2006). Reeve has conducted extensive work that has developed key constructs that teachers can use in both classroom and non-classroom settings to facilitate an autonomy-supportive setting. The combined application both within and outside the classroom has demonstrated the applicability and flexibility of using SDT within a variety of educational settings.

Research on motivation and psychological needs in PE has showed that whether students are motivated within or outside the physical education setting is dependent upon their perceptions of a psychologically supportive environment (Ntoumanis, 2001). In essence, a student will motivationally flourish in a setting that supports their psychological needs of autonomy, competence and relatedness. The educational context, whether face-to-face or online, should support those three psychological needs in order to influence the motivation of students (Deci & Ryan, 2012). Deci and Ryan (1985) stated the importance of each need as a separate construct, as well as the combined importance for students, their motivation and engagement in activities (Sheldon & Filak, 2008). PE focused literature illustrates that certain pedagogical approaches can facilitate change and support for student's psychological needs (Perlman, 2011).

Of importance in PE is the implementation of experiences which support all three needs and in turn influence a student's self-determination (Ntoumanis et al., 2004; Deci & Ryan, 2000). Supporting those three basic needs is a recurrent finding from SDT's research in other areas as academic (Taylor, Lekes, Gagnon, Kwan, & Koestner, 2012), psychology (Kuzucu, Yasar, & Simsek, 2013) and well-being (Milyavskaya, Philippe, & Koestner, 2013). Also, on PE there is a need to conduct SDT-grounded research to understand the differences between content areas, such as theory-based and practical/applied subjects (Schunk, 2005a). However, the extensive research in SDT within PE is mostly about students' and teachers' motivation within specific activities (Standage, Duda & Ntoumanis, 2005; Carson & Chase, 2009; Perlman, 2013; Van den Berghe et al., 2014) with limited inquiry in the area of Physical Education Teacher Education (PETE). To date a limited number of studies have been conducted using SDT in PETE. These studies have been focused on the development of future teachers' abilities to develop and implement pedagogical principles for developing an autonomy-supportive educational setting (Perlman, 2015; Perlman & Piletic, 2012). Furthermore, drawing upon the broader higher education literature, much of the research framed using SDT has been focused on how engagement in social contexts can facilitate the subject specific learning and achievement of students (Black & Deci, 2000; Deci & Ryan, 2012). While these studies illustrate some promise for using SDT grounded approaches, they are limited by the focus on (a) face-to-face settings and/or (b) non-physical activity-based subjects. SDT was used as a theoretical framework for this study because it provides a useful lens for understanding the connection between what a teacher does (i.e. social context) and the inherent influence on the student (e.g. motivation), and this study extends SDT research into online learning in PE.

In summary, motivation is a key concept within PE that has a strong association with student behaviours such as engagement and involvement in learning (Gallegos, Extremera, López & Abraldes, 2014; Alderman, Beighle & Pangrazi, 2006). SDT has been used as a framework to understand the motivational process in many settings, including PE, with some initial focus within PETE (Van den Berghe et al., 2014; Perlman & Piletic, 2012). The universal nature of using SDT to support motivation in a TELE/PETE program seems viable, since those concepts (e.g., needs support) that are useful in a face-to-face setting also relate to online education (Chen & Looi, 2007).

2.2 Self-Regulated learning

Self-Regulated learning(SRL) (Dettori & Persico, 2010) is the ability to control one's learning environment, but must not be labeled as a mental ability or skill (Shuy, 2010). Instead, SRL is the active, constructive process (Pintrich, 2000) which allows students to regulate their own cognitive processes (Puustinen & Pulkkinen, 2001) to achieve student-set goals, maintain motivation and take responsibility for their own learning (Heikkilä & Lonka, 2006). SRL can be developed in students to achieve successful use as early as primary school (Dignath, Buettner & Langfeldt, 2008) and across diverse domains (Morshedian, Hemmati, Sotoudehnama & Soleimani, 2016).

SRL research first began in the 1970s with the idea that students' lack of metacognition (awareness about one's own thinking) was a factor in student deficiencies in learning. From this initial research came a search for social influences (e.g. teacher modeling and instruction) that facilitated and/or influenced students' development of self-regulation (Zimmerman, 2002). From those first works and following the time when differences between metacognition and self-regulation were clarified (Pintrich, 2000), different models of SRL developed (Zimmerman, 1989; Winne and Hadwin, 1998; Pintrich, 1990; Boekaerts, 1999; Borkowski, Chan & Muthukrishna, 2000). These models are similar in conceptualizing the general SRL process, but have different theoretical backgrounds (Puustinen & Pulkkinen, 2001).

2.2.1 Elements of Self-Regulated learning Theory

Learners considered as self-regulated show characteristics such as time management, critical thinking, control of effort and setting goals (Pintich & De Groot, 1990; Wang et al., 2010), display motivational, emotional and social skills (Zumbrunn, Tadlock & Roberts, 2011; Zohar & Dory, 2012), and consider themselves as motivated and hard-working, and appropriately strategic (Meltzer, Katzir-Cohen, Miller & Roditi, 2001). Self-regulated learners utilize various strategies to achieve their goals and monitor, control, regulate and adjust their learning (Wang et al., 2010). Topics researched in SRL are diverse, including self-regulated writing, task attraction, strategy training, self-reporting, self-efficacy, discipline and motivation (Puustinen & Pulkkinen,

2001). The applications of SRL have included a variety of educational domains such as Science (Baris, 2017), Business, Psychology, Mathematics and Technology (Schunk & Zimmerman, 2011).

The present study considers motivation and the educational context as main factors for the development of SRL. Self-regulation models stress the importance of context and motivation to create effective TELEs, which is important to this study because going from one traditional context (e.g. a PETE's classroom) to a different educational setting (e.g. TELE) can affect self-regulation (Zimmerman, 1990) and the motivation of students' Self-Regulated learning (Pintrich, 1990; Popa, 2015). Using the SRL model developed by Pintrich (1995), Self-Regulated learning can be influenced in phases (forethought, planning, activation; monitoring; control; reaction, reflection) across different areas for self-regulation (cognition, motivation, behavior, context) (Schunk, 2005b). This model stresses that context is important and gives a clear pathway to support professors in the design of their teaching and students in adopting self-regulation processes. This model has been utilized for research in a variety of studies as diverse as Science Education (Baris, 2017), Primary schooling (Wagener, 2013), Lifestyles and SRL (Tezci, Sezer, Aktan & Gurgan, 2016), understanding procrastination (Yamada et al., 2015). Furthermore, research on the Pintrich (1995) model has led to the creation of instruments for the evaluation of SRL (Núñez, Amieiro, Álvarez, García & Dobarro, 2015).

Pintrich's Model of SRL was the one selected for the present study because even when most SRL theories emphasize the influence of motivation and SRL (Panadero, 2017) Pintrich's Model "stresses the importance of motivation in *all* phases of self-regulation (Artino & Stephens, 2006, p. 2). This association between SRL and motivation is important because even successful students in the classroom must adapt or activate new Self-Regulated strategies in the face of new tasks or environments (Cleary & Zimmerman, 2004). As such, students must be motivated or self-determined to allow for an enhanced level of learning (Deci & Flaste, 1996; Pintrich, 1999). Considering the importance of human motivation and the similarity between SDT and SRL, results of this study may allow for the synthesis of broad categories that assist in investigating each research question.

2.2.2 Relevant Applications of Self-Regulated learning

Existing SRL literature and research in PE indicates there has been some focus on the quality of PE lessons (University of Birmingham, 2017) and self-regulatory process in sports (Kitsantas & Kavussanu, 2011; Kitsantas, Kavussanu, Corbatto & Van de Pol, 2017). However, most of this research has been on adolescents and with a limited focused on goal setting and monitoring, modeling, social feedback and emulation within the competitive and elite sport domain. There is a lack of application of SRL in PE settings with tertiary students (McBride & Xiang, 2013). Furthermore, there is a lack of information about students' Self-Regulated learning in physical activity contexts at the university level (McBride & Xiang, 2013).

There is a larger body of relevant research on SRL in online environments, within which SRL is believed to be critical to improving students' learning outcomes (Lynch & Dembo, 2004; Rowe & Rafferty, 2013; Pardo, Han & Ellis, 2016). It is also suggested that online learning provides an opportunity for professors to cultivate students' self-regulation (Lock, Eaton & Kessy, 2017; Johnson & Davies, 2014). However, students can demonstrate different levels of Self-Regulated learning in different settings, and can be categorized, for example, into five profiles (Barnard-Brack, Lan & Paton, 2010):

- Super self-regulators, who endorse higher skills and strategies of Self-Regulated learning.
- Competent self-regulators, students who moderately to highly endorse skills and strategies of Self-Regulated learning.
- Forethought-endorsing self-regulators, who appear "to more highly endorse goal setting and environment structuring as Self-Regulated learning strategies and skills while endorsing task strategies, time management, help seeking, and self-evaluation to much lesser extents" (p. 8).
- Performance/reflection self-regulators, who appear "to more highly endorse task strategies, time management, help seeking, and self-evaluation as Self-Regulated learning skills and strategies compared to goal setting and environment structuring" (p. 8)
- Non- or minimal self-regulators, who are those with skills least endorsed with Self-Regulated learning.

Thus, teachers in digital environments should first consider their students' capacities to self-regulate within the particular context because online students must exercise higher levels of self-regulatory competence to be successful (Artino, 2008; Johnson & Davies, 2014).

Five SRL attributes have been identified as important to online learning success: motivation (desire to engage), Internet self-efficacy (comfortable and competent with technological tools), time management (ability to appropriately schedule tasks), study environment management (ability to adequate virtual spaces to the learning process) and learning assistance management (where and how to seek help) (Lynch & Dembo, 2004). Some researchers argue that students must be more participative in online environments due to the higher level of perceived independence associated with virtual environments (Zhu, Au & Yates, 2013). Online students with high achievement scores show better action control strategies (Ting & Chao, 2013). However, even though some research shows that students who are self-regulated in school settings are more likely to be self-regulated in online environments (Shen, Lee & Tsai, 2009), other studies show that students who demonstrate high levels of self-regulation in their learning can have problems when in new or online environments (Cleary & Zimmerman, 2004; Dabbagh, 2007; Broadbent & Poon, 2015). No matter the case, self-regulation has a profound influence on the success of a student within an online environment.

It has been suggested that research in online learning has often lacked theoretical or conceptual frameworks and could benefit from a stronger grounding in learning theory (Artino, 2008). Furthermore, there is a need to research SRL in different online settings (e.g. partially online versus purely online courses) (Lynch & Dembo, 2004). This grounding in theory would help to test whether positive relationships between the use of SRL strategies and academic outcomes shown in traditional learning settings apply in online education. Specifically, factors such as metacognition, time management, and effort regulation are of principal importance to the success of the student (Broadbent & Poon, 2015). Since SRL is one of the effective strategies to improve skills for students in Technology-Enhanced Learning Environments (Samruayruen, Enriquez, Natakuatoong & Samruayruen, 2013), universities may benefit from improving students' skills for SRL both within this educational setting and for their future endeavors (Zhu, Au & Yates, 2013).

2.3 TELEs in Higher Education

According to the Joint Information Systems Committee (JISC) (2014), TELEs "encompass virtual and physical technology enhanced learning environments; incorporating physical learning spaces, institutional virtual learning environments, personalized learning environments and mobile and immersive learning environments" (JISC, 2014, pg. 1). The use of these online technologies is common for today's students (Paechter & Maier, 2010). For example, in the United States of America the number of distance education students shows a steady yearly increase, with 28% of students taking at least one distance education subject (Babson College, 2015). Furthermore, the prevalence of online education is evident as 77% of colleges and universities in the United States offer online courses (Parker, Lenhartand & Moore, 2011).

Universities recognize the value of TELEs (Hachey, Wladis & Conway, 2012; Kirkwood & Price, 2014) and many college Presidents consider that online courses offer an equal value compared with courses taken in a classroom (Parker, et al., 2011). An assumption within higher education institutions is that the introduction of online technologies will inherently make changes to the educative practice (Kirkwood & Price, 2014). However, sometimes technological innovations create more uncertainty for technology integration (Goodyear, 2015). In addition, Dettori and Persico (2010) suggest that, in order to be considered to enhance a learning environment, technology in education must increase students' Self-Regulated learning. Taken together these factors present a complex environment for universities and their teaching staff.

While there is a significant change in online versus face-to-face educational practices, universities tend to teach in conventional ways, while students are working and learning in different ways (Goodyear, 2015). Thus, higher education institutions are facing the challenge of designing programs that reflect the technological advancements needed for today's students. Rather than just introducing technologies into the same teaching designs and expecting a change, universities need to go through a full process of learning about current technologies and pedagogies (Gabriel & Kaufield, 2008; Sun & Chen, 2016; Jacobsen, Brown & Lambert, 2013; Groff, 2013). Furthermore, universities must work with effective course designs that require interaction between participants/students and instructors to provide adequate preparation and support (Cho & Kim, 2012; Crawford-Ferre & Wiest, 2012).

While technology-enhanced learning research is already extensive and can inform new approaches to teaching, researchers as Sabelli have argued that it needs to be more "systematic, credible and achievable", and include "theory building, building the knowledge base, and establishing education practice" (as cited in Heeter, 1999, p. 101). Important areas of research could explore support for online instructors, help seeking in online academic environments (Cheng, Liang, Tsai, 2012), detecting strengths and weakness of online education (Crawford-Ferre & Wiest, 2012) and the possibility of hybrids communities integrating both virtual as well as physical environments, operating on the real world (Duval, Sharples & Sutherland, 2017). On that respect TELEs, combining both virtual and physical environments, are a convenient option for areas as PE traditionally relying on physical environments for their development. Also, TELEs need more research about their development and application on more practical fields, as PE.

2.3.1 TELEs in Physical Education Teacher Education

Although online education within PE is limited, there are some programs that are beginning to offer degrees. Open University of Australia offers some subjects directly oriented to PE as Health and Physical Education, but in a Bachelor of Education not a Bachelor in PE (Open Universities Australia, 2015). Other degrees are focused within the areas of isolated sport-related courses as weight training and chemistry of sports (Massachusetts Institute of Technology, 2016) and/or general fields such as kinesiology (e.g., California Baptist University; Eastern Oregon University). A plausible reason for the affordance of having an online degree in these areas and not in teacher education could be attributed to higher education's future students preferring face to face instead of online learning, especially if interpersonal relationship is part of the expected outcomes (Paechter & Maier, 2010; Kemp & Grieve, 2014). PE teacher education as a route to certification is believed to develop and apply interpersonal skills (e.g., practice care for others) (Fitzpatrick & Pope, 2005) which could contribute to the low demand for online PE degrees.

In Mexico, a review of programs to date could not identify any current Bachelor of PETE offered online. An examination of Mexico's Open Universities Group (2015) (which is the flagship program for online education) does not currently offer such a program in PE either.

PE research on self-regulation, motivation and pedagogy (i.e. SDT) has been widely studied in PE classes and traditional classroom PETE programs (e.g. Alderman et al., 2006; Hagger et al., 2007; Ntoumanis & Standage, 2009; Olson, 2009; Perlman & Goc Karp, 2010; Kretschmann, 2014). To date, there does not appear to be any research about TELEs in PETE courses.

Furthermore, traditional paradigms in PE are still strongly grounded in the notion that face-to-face is the only effective means for educating future PE specialists. That could be because teachers reflect the way they were taught in the way they teach (Cox, 2014). However, TELEs are an ever-emerging model of teaching and learning. Without research into these approaches, there is no evidence to provide support and/or refute this mode of teaching. When examining innovative instructional environments, it is common to find little research directly linked within the area to research (e.g., PE) (Richey, Klein & Nelson, 2003), and in particular the omission of literature in TELE in PETE is notable. As such, the intention of this literature search was to "identify literature relevant to the foundational theory of the project, even though the link may be indirect" (Richey et. al., 2003, pg. 1115).

2.3.2 A TELE for PETE in the Context of the Study

This section links relevant literature with specific information about the context for this study within the Faculty of Physical Culture Science (FPCS) at the Autonomous University of Chihuahua (AUCh).

The Inter-Institutional Committees for the Evaluation of Higher Education (ICEHE) evaluates academic programs in Mexico in regard to elements of administrative aspects, academic model, and curriculum, school trajectory of students, academic staff and infrastructure. Evaluation of programs can be rated a Level 1(all the committee's requirements are covered) or Level 2 (not covering all the requirements). The PETE program offered by the Faculty of Physical Culture Science (FPCS) is labelled as a quality program on Level 1 (ICEHE, 2015). While the PETE program within the FPCS is at Level 1, there is some concern with meeting the future needs of students. Many PE professors within the FPCS have been working for many years in the same environment. There is a history of many professors who have first been a student within the AUCh and now return as university professors. Their training and previous educational

46

experiences have relied on a face-to-face method which is currently the popular choice for teaching future PE specialists: "Many of the professors that teach in this faculty are or were educated under a traditionalist system, and then it would be a huge change… Maybe as I was trained in a traditional education, there is no better way that student being here, in person (i.e., face-to face) building their learning" (Faculty's Academic Chairman, Interview, Phase One). This notion of teaching the way a person was taught is supported by the research conducted by Cox (2014) who stated that professors frequently reflect the way they were taught in the way they teach. Although there are no identified studies about the impact of the pedagogical practices in this particular faculty, professors in the FPCS are provided the following professional opportunities:

1. All new professors engage in a mandatory course focused on classroom pedagogical practices (not online pedagogical practices) twice a year.
2. The FPCS primary aim is teaching within the traditional face-to-face educational settings.
3. The Autonomous University of Chihuahua offers a diploma of Online Teaching but it is not a mandatory requirement for FPCS's professors/instructors. However, the instructors from the diploma participate as a support group for teaching within all university online programs.

Some characteristics of teaching and learning in the Faculty and at the University seem to prepare PETE students to be self-regulated. These include:

1. The program includes typical PE teaching practices thought to develop SRL. For example, stress reactions during physical activity (e.g., sweating and increased heart rate) help students to develop self-efficacy beliefs (Artino, 2018); and "through movement experiences, students also develop important social-emotional skills such as self-regulation" (Acara, 2013, p. 7). Further, within the PETE program students must be in charge of their educative process and develop an attitude of reflective inquiry (AUCh, 2008). These are aspects relate to the concept of SRL (Kremer-Hayon & Tillema, 1999).
2. Most of the faculty's students (70%) participate in regional level sport practice, with a proportion (30%) involved in high level state and national sports. Athletes show clear patterns of self-regulation (Cleary & Zimmerman, 2004; Kitsantas & Zimmerman, 2002). This suggests that most of the faculty's students engage with self-regulation in non-

academic settings (i.e., sport). This may provide a foundation for motivating them to use strategies for self-regulation in academic settings.

3. FPCS's students perceive themselves as having high self-efficacy for indicators of academic behavior (e.g., communication, attention and excellence) (Ornelas, Blanco, Peinado & Blanco, 2012) which is a condition that has been found to promote self-regulation (Zimmerman, 1990; Bandura, 1993; Pajares & Schunk, 2001).

4. The AUCh's educative model is based in SRL theory and considers students as an autonomous and responsible person who should be able to self-manage their own learning (AUCh, 2008).

Thus, using theories of SRL to help in the design and application of a TELE seems to align well with the context for this study. The next section covers specific considerations for the design and implementation of TELEs derived from the literature that informs the process of this research project.

2.4 Design and Implementation of TELEs

Research indicating the conditions for an enhanced level of student self-regulation, engagement and motivation (Higgins, Xiao & Katsipataki, 2012) supports the effectiveness and educational potential for using TELEs within higher education (Andrade & Bunker, 2009). However, even with the potential benefits of using a TELE, the instructional approach (i.e. pedagogical principles) plays an integral role in ensuring the quality of the online learning experience (Means, Toyama, Murphy, Bakia & Jones, 2009; Casanova, Moreria & Costa, 2011). The following summary of the literature highlights some of the issues that should be considered when designing a TELE, encompassing pedagogy, Self-Regulated learning and motivation.

2.4.1 Pedagogical Design Principles

Universities and Colleges Information Systems Association (UCISA, 2003) states that effective pedagogical design is critical in TELEs. While the pedagogical design is important, these concepts are consistently not taken into consideration or at a minimum are viewed as secondary when compared to the technical aspects within an online educational experience. In addition,

sometimes the designers of online experiences are the school's professors/instructors, who typically are not trained in pedagogy and/or well supported (Bennett, Agostinho & Lockyer, 2017). These aforementioned factors illustrate the potential for weak pedagogical elements within a TELE and provide insight into how the beliefs and assumptions of educators might negatively influence the design, implementation and evaluation of technology in education (Price & Kirkwood, 2014).

Professors/instructors may need to have expert support that is grounded in evidence-based theories to inform the design of strong pedagogical-based TELEs. As such, institutions need to ensure that instructors of online subjects understand the difference between design for traditional classroom and TELEs. Otherwise, students could face difficulties when working in TELEs even when they demonstrate components of effective Self-Regulated learning and motivation (Blanco, 2010). Within this study it was proposed that educational support from pedagogic specialists in the Educative Services of Chihuahua and a technical expert's group from the AUCh, should be provided for professors and students throughout the entire project. This educational support is in alignment with the recommendations of UCISA (2003) about adequate pedagogical designs on TELEs and Bennett et al. (2017) about the lack of pedagogical training for professors working in a TELE.

In addition, there is an identified need for practical pedagogical models (i.e., theoretical constructs derived from learning theory) that are underpinned by theory (Mayes & De Freitas, 2004; Graine, 2010) and empirically tested in real settings (Wang and Hannafin, 2005) to enhance the quality of the online learning experience. E-learning pedagogical models are technological enhancements of existing models that only could be considered appropriate if technology plays a specific role in supporting learning (Mayes & de Dreitas, 2004; Dettori & Persico, 2010). Within this study and in order to address the aforementioned aspects, a TELE (Ramdass and Zimmerman, 2011) was utilized as an educative setting supported by technology focused on enhancing the educative process by developing self-regulation skills (Dettori et al., 2005; Trigano, 2006; Carneiro et al., 2011) and being supported by theoretical frameworks of SDT and SRL (Dettori et al, 2005; Artino & Stephens, 2009; Chen & Jang, 2010; Bachman & Stewart, 2011; Noour & Hubbard, 2015; Somayeh & Takeshi, 2017).

2.4.2 Designing for Self-Regulated learning

Research suggests that learners do not demonstrate Self-Regulated learning (SRL) in the same manner within all domains (Pintrich, 2004). Students can use motivational self-regulated strategies, such as positive self-talk, depending on their personal interest in the task or educational content area (Hall & Goetz, 2013). Thus, participants in this study could demonstrate different motivation and components of self-regulation depending on the delivery of the educational material (online or face-to-face). Pintrich (1995) indicated that SRL developed in the traditional classroom does not always translate well into other environments. This must be considered when presenting students with a more autonomous online environment like a TELE. For Dabbagh (2007) "given the physical absence of an instructor in online learning, the ability of learners to monitor and regulate their own learning is critical" (pg. 220). Therefore, some researchers recommend that instructors and instructional designers embed features such as self-monitoring, goal and action plans and feedback, and motivational prompts in instructional materials to encourage learners' self-regulation (Harris, Lindner & Piña, 2010).

A social-cognitivist perspective on SRL advocates the importance of the educational context. Even when an online setting can promote the SRL process (Bartolomé & Steffens, 2006), taking context into consideration is important for the impact on the student's academic success. Therefore, self-regulation models that stress the importance of context are important as theoretical frameworks to create effective TELEs because there is limited understanding of the process to enhance the self-regulation from autonomous motivation (Legault & Inzlicht, 2013). For this reason, Pintrich´s (2000) model of SRL provided the conceptual framework for this study with consideration given to the specific phases (forethought, planning, activation; monitoring; control; reaction, reflection) and areas for self-regulation (cognition, motivation, behavior, context). The application of this model is detailed in following chapters in this thesis.

2.4.3 Designing for Motivation

While TELEs have demonstrated promise in providing positive educational experiences (Bernacky et al., 2011), there is more inquiry needed to understand how these academic environments influence the use of Self-Regulated strategies (Abrami, Bernard, Bures,

Borokhovski, & Tamim, 2011). Motivation is necessary for SRL to occur because without enough motivation, SRL could neither be initiated nor sustained (Artino, 2008). Furthermore, a lack of pedagogical support and understanding in the design of TELEs could facilitate an information delivery approach and not the desired outcomes identified in subject outlines or syllabi (Parker, 2011).

Research into motivation in online environments has been limited and more is needed (Chen & Jang, 2010; Miltiadou & Savenye, 2003; Bekele, 2010). Chen and Jang (2010) warn that "despite its significance on learning consequences, motivation has not received commensurate attention in online learning" (p. 741); and Wilson (2014) reiterates the limited research into the distinct perceptions or dynamic interplays between professor and student learning in online environments. Research indicates that when a student's emotional and motivational requirements are satisfied, they will be motivated to self-regulate (Deci & Vansteenkiste, 2004; Sierens, Vansteenkiste, Goossens, Soenens, & Dochy, 2009; Vasic, Keis, Lau, Spitzer, & Streb, 2015). Since motivation is a multi-factorial and dynamic construct that influences students' choices and behaviours (Seyler, Holton, Bates, Burnett & Carvalho, 1998; Pintrich & De Groot, 1990), motivational theories, such as SDT, can inform the design of learning environment that foster self-regulation.

Rigby and Przybylski (2009) provide evidence about how tenets of SDT can be applied within online settings. For example, in online video games, players can choose the challenge level (competence) and decide between "individual and communal goals within the self-determined context" (p. 8). The online context supports participants to succeed by allowing them to discover (autonomy) and resolve challenges according to their capacities (competence), allowing new and personal ways to interact (relatedness) and positioning the participant to solve the task. From the literature in both areas, academic learning and online games, there is a connection between and a promise for future joint work for researching about educational technology (Rigby & Przybylski, 2009).

In summary, the body of literature that examines SDT within online education suggests the following: (a) TELEs could facilitate student motivation toward the use of self-regulatory skills,

(b) when students' psychological needs are supported, they will be more determined and regulated, (c) research about the basic elements of self-regulation and motivation in online environments is needed. As such, utilizing motivational theories and concepts housed under SDT will help to motivate students. SDT provides both theoretical and practical concepts for infusion within a TELE.

2.5 Implications for this Study

Theories of SDT and SRL are relevant to the design and implementation of a TELE in PETE. To date these theories have been applied and examined separately across the domains of PE, PETE and online education. There is, however, a conceptual connection and possible synergy that may lead to an enhanced understanding of TELE. Therefore, this study used a hybrid approach based on SDT and SRL as theoretical frameworks to research the design and implementation of TELEs in a PETE program. Further, because the role of context is emphasized in both theories, this study was conducted using a design-based research (DBR) methodology in the real-world setting of the Faculty of Physical Culture Science (FPCS) at the Autonomous University of Chihuahua (AUCh). DBR is a "systematic but flexible methodology aimed to improve educational practices through iterative analysis, design, development and implementation, based on collaboration among researchers and practitioners in real-world settings and leading to contextually-sensitive design principles and theories" (Wang and Hannafin, 2005, p. 6). The key goal of DBR is to offer practical results from research in context but with wider findings that might be applied in other settings (Herrington, McKenney, Reeves & Oliver, 2007). This overlap is represented in Figure 4, showing the particular focus of this study.
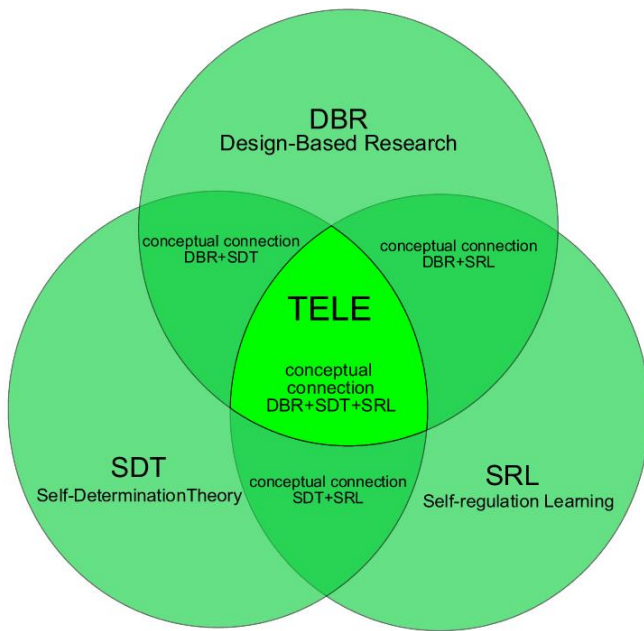
Figure 4: Conceptual connection SDT, SRL, DBR that may lend an enhanced understanding of TELEs.

The next chapter will outline the research design and methods which applied this approach.

Chapter Three: Methodology

3.1 Introduction

Chapter 3 provides an overview of the research methods for this study, which includes the process and instruments utilized to collect data, the procedures of data analysis, study participants and context. Since this was a new phenomenon in a context were many variables (e.g. academic, administrative and personals) could come into play, was important to use not just instruments that "simply" collected data, but strategies that allowed for a profound understanding of the participants' thoughts as focus group and personal interviews. After some of those interviews even new ideas, not collected during questionnaires, comes to the study (e.g. hidden curriculum). This was evident within this study as the research focus examined elements of the TELE that influenced the quality of the educational experience from both the student and professor perspective. That is important on qualitative research were most of the time additional questions can arise (Corbin & Strauss, 1990). In addition, since the researcher's role and understanding of the research process could affect the process itself, an ontologic and epistemological section show what the researcher experienced about reality and the possibility of accessing that reality. In addition, information is provided on the research design, theoretical framework, ethical considerations, and limitations of this study. That followed an audit trail's strategy description of the steps taken from the study's start, until the findings' reporting, to ensure study's rigor (See Table 2 for a full list of quality strategies).

This study used a qualitative case study approach within a design-based research methodology to broadly investigate the design and implementation of a TELE within a university PETE subject. Initially, this study was guided by following research questions:

1. How can self-determination theory and Self-Regulated learning be applied to design an effective technology enhanced learning environment (TELE) in Physical Education Teacher Education (PETE)?
2. How do students, professors and university staff engage with a TELE in PETE?
3. How does the organizational culture affect the effective design and application of a TELE?

3.2 Research Approach

An aim of qualitative research is to understand what the world means for people "in that particular point in time" (Merriman, 2002, pg. 114), using multiple sources of evidence, understanding participants' perspectives and views, and under real-world conditions. Qualitative research is "of specific relevance to the study of social relations" (Flick, 2009, p12), providing information about intangible factors, such as social norms, socioeconomic status, gender roles and ethnicity (Mack et al., 2005). According to Yin (2014), qualitative research can contribute to explaining human social behavior. A qualitative approach was appropriate for this study because the research team wanted to know how students would work in this new environment of online education not only via their final grades, but to understand their thoughts and ideas during the whole educative process, and at very specific times how some less obvious factors (e.g., organizational culture) might influence the process.

While there are many qualitative approaches available to researchers, a case study approach was utilized within this research. Yin (2014) explains, "a case study is an empirical inquiry that investigates a contemporary phenomenon within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident and will be many variables and multiple sources of evidence" (p. 18). A case study is particularly useful if the phenomenon is new or unexamined (Travers, 2001) and when the contextual conditions could be pertinent or have a specific influence on the phenomenon (Yin, 2014; Hartley, 2004). A case study approach was deemed appropriate for this research because the research team were examining a new and complex phenomenon with many participants and stakeholders (i.e. a TELE in PETE). Furthermore, both literature and personal experience illustrate that the context and the interactions between participants, professors, students and administrative staff under real world conditions can influence the experiences of the people involved. Finally, Simons (2009) stated, a "case study is an in-depth exploration from multiple perspectives of the complexity and uniqueness of a particular project, policy, institution, program or system in a 'real life' context" (p. 21). As such, by adopting a case approach this study could include the multiple perspectives of key stakeholders involved across this particular university.

The case for this study was one specific online subject, from one academic program, conducted in the Faculty of Physical Education in a public University in México. Since one online subject was a new way to work in this educative context, our research approach was from the perspectives of the multiples participants which included the professors, students and professional/administrative staff that supported the design and implementation of the TELE. Furthermore, the sustained engagement of researching the subject during the whole semester, with the researcher closely engaged as a participant-observer, helped to gain an understanding of the complex interactions between the different participants under real life conditions. It should be noted that a purposeful case was chosen using this subject from this university due to the AUCh's Academic Model that grounded their philosophies within SRL (AUCh, 2008) and their desire to develop innovative pedagogies using TELEs (AUCH, 2011).

3.2.1 Ontology and Epistemology

From an objective point of view any research is a desire from the researcher to know reality in a given time and space, and most of the time a researcher hopes to influence the reality that is under research as little as possible (Fink, 2000). In general, this creates a division between an objective (i.e. not to influence/affect reality) and subjective (i.e. influence/affect reality) way to research (O'Gorman & MacIntosh, 2015). However, sometimes the researcher's desire for knowledge comes also from a personal need to know and understand that reality (Fink, 2000). As such, the research approach implemented to examine that knowledge of reality can be influenced by researcher's ideas and personal views (i.e. bias, subjectivities). Therefore, it is important for the researcher to consider their personal lens for conducting research and identify the biases that inform their choices and decisions within the research study.

From my perspective and past experiences working within PE, professionals are generally not technology users, especially when compared with sports professionals (SP). For example, when speaking with my PE colleagues, most do not feel comfortable using technology or even trying to learn about it. This limited engagement and involvement with technology has interested me because I believe there is a potential use and need for professors and instructors to learn more about using technology. However, knowing I have an interest in technology may have affected

the research process through my personal lens. As such, a question that I needed to continuously address throughout this study is how to identify and address when my biases occurred.

First, I am aware that DBR methodologies require close interaction between researcher and participants (Anderson & Shattuck, 2012), yet cautionary steps must be taken in order to make credible and trustworthy assertions (Barab & Squires, 2004). One step is to be careful about the researcher's double role as designer and researcher, and the possible impact on the interactions that are part of their final claims. Having an expert group working as much as possible with me in the design phase was a plausible way to be aware of and limit my own influence as designer and researcher. Also, how must the researcher act when facing ethical problems in the research? For example, what should be done when a professor is using a different approach to the University's academic model? The researcher must be aware of the professor's academic freedom and how that specific faculty works. Again, having an academic assessor in the expert group who understands the cultural organization of the faculty helped me to respond to such issues.

Second, I was researching in my own faculty, with implicit historical elements and memories from past conversations with students and professors that could influence my decision-making process. In such a scenario it is very difficult, but desirable, to separate my own ideas and thoughts from those from the participants. In order to achieve that, I made written and audio notes at the end of interviews about my initial ideas. Later, I had meetings with one member from the expert group in order to clarify how my impressions could have been influenced by my previous ideas (biases). Also, all the results were discussed by the expert group in order to clarify ideas and detect/address possible researcher bias.

Finally, as a researcher, I needed to be aware that all my beliefs and interactions would impact my ideas and decisions somehow. These decisions would be closely examined in regard to (a) what is reality (i.e. ontology), (b) how I know that reality (i.e. epistemology) and (c) how am I going to find that reality (i.e. methodology) (Guba, 1990). (See Table 2 for a full list of study's rigor ensuring strategies). In the following sections I outline my own ontological and epistemological positions to provide transparency for the reader.

Ontology: What is Reality?

In research there has been a historical division between qualitative (subjective) and quantitative (objective) modes of research (Guba, 1990) with specific paradigms influencing how the researcher can access and perceive reality (i.e. ontology). Patel (2015) stated that the ontological viewpoint (i.e. what is reality) has developed from a positivism view where reality is a single truth to a critical one which see realities as socially constructed. The present study does not align with the strict division of paradigms in research; specifically, the division of research methods between quantitative or qualitative. Instead, this study and the researcher aligns his perspective with the advice of Furlan (2017) who stated that this research division "confuses and impoverishes the conception of knowledge or science" (p. 83). Instead, we should discuss the "investigated reality" instead of the "many methodological questions, conflicting or not" (Furlan, p. 83). As a graduate from a Physical Education bachelor's degree in Mexico and being involved with the use of technology in education, my ontological view of what is reality was mostly related to sports and technological outcome measurements, such as time and length. This is an ontological positivism of "a single truth" that can be measured and we just need to find the right tool to do that (Patel, 2017). However, after 10 years as a higher education professor my ideas have changed and now, I am of the mindset that the educative process cannot be as simple as a direct relationship between professor and students, but a complex interaction between all the participants: professors, students, and staff, each with their own perspectives of any given context. From that, my ontological view on this study accepts that reality could be, at the same time, different for individuals and groups (i.e., ontological constructivism) and under constant change in new unpredictable situations (i.e., ontological pragmatism).

Epistemology: How can I Know Reality?

Following the above mentioned ontological pragmatic/constructivist view of what is reality, my view about how I know that reality (i.e., epistemology) is one that goes from the constructivism/interpretive (e.g., reality needs to be interpreted) to a critical/pragmatic that investigates the best methods possible to know a reality under constant changes (Anderson & Shattuck, 2012). This is especially important when the research approach involves many

different people (professors, students) and settings/contexts, who bring their own knowledge and views of that reality.

Following this epistemological approach, I adopted a pragmatic perspective. This guided my choice of a theoretical framing that draws together two theories that conceptualize a student's individual motivation for learning as dynamic and inherently shaped and responding to features of the educative environment and which "can only be inferred by observing behavior, either in real performance situations or by self-reporting" (Guimarães & Bzuneck, 2008, p.111). I also chose the specific methodology of design-based research within the overall case study approach and adopted mixed methods for an enhanced comprehension of changing realities for that, questionnaires, focus groups and interviews were utilized, also, some strategies to ensure the rigor on the study with strategies of triangulation, peer review and member checks.

3.2.2 Theoretical Framework

The theoretical framework for this study draws on Self-Determination Theory (SDT) and Self-Regulated learning (SRL) theories. An outline of the theories and applications has been provided in Chapter 2 of this thesis.

To briefly summarize, SDT is a theory for studying human motivation that provides a sound framework to examine the dynamic process between people and the environment (Deci & Ryan, 1985). In PE, an area of SDT research has been focused on social contexts that facilitate positive student experiences (Perlman, 2013). "Situations in a PE class where students have the chance to work together and help each other learn (e.g., when they are taught a new to skill) make them feel closer and more connected to their fellow students" (Ntoumanis, 2001, p. 236). Van den Berghe et al. (2014) confirmed the motivational sequence proposed by SDT in PE, supporting SDT as a valid framework for the construction of an educative environment that influences motivation in PE. This study has used the key concepts of SDT for the following:

- The design and implementation of a TELE for PETE: According to SDT, professors and administrators must design learning environments (e.g. TELEs) that support student learning and support their inherent psychological needs (Ryan & Deci, 2000). SDT is a

tested model to influence and sustain the motivation of students but has had relatively limited application in TELEs. Working with the researcher, professors and students helped to design the TELE and its associated learning resources, in accordance with the concepts of autonomy, competence and relatedness.

- Data collection: Self-determination related questionnaire items were used to collect data about students' experiences of the TELE. It is important to note that questions were drawn from the Basic Psychological Needs Scales (BPNS) (Ntoumanis, 2001) and the Learning Climate Questionnaire (LCQ) (Williams & Deci, 1996). Since Self-determination is about motivation, competence and relatedness and the student-professor relationship and how students feel about the academic environment (e.g., possibility of choice), items from the LCQ like: "I feel that my instructor provides me choices and options" and from the BPNS like: "There is not much opportunity for me to decide for myself how to do things in my daily life" and "I feel pressured at work" were utilized to develop focus group questions. For example, these became: "Do you feel like you have choices about some aspects in your subjects? "Do you think that are you using those in the school?"; and "How is the faculty helping you to be more autonomous". And for professors the following related questions were posed: "Do you think we [faculty] encourage students to be autonomous?"; "What sort of choices do you make about teaching your subject?"; and "Do you feel as a teacher that online education is a context where you can be successful?"

Furthermore, SRL is an active, constructive process (Pintrich, 2000) by which students can regulate their own cognitive processes (Puustinen & Pulkkinen, 2001). SRL is one of the most studied aspects of the educational process with many previous applications (Carneiro et al., 2011). At least five models, with some similar characteristics, are considered as useful for researching SRL (Puustinen & Pulkkinen, 2001). From those models, Pintrich's SRL model was chosen for this study. This model emphasizes motivation and has been applied in studies of factors associated with schooling in real contexts (Shunk, 2005), and is suitable for a range of different methodologies. There have also been relevant applications to inform the design of online learning, for example Andrade and Bunker's (2009) Model for Self-Regulated Distance Learning (MSRDL). This study has used the key concepts of SRL for the following:

- The design and implementation of a TELE for PETE: Pintrich´s SRL model has guided the professors and students involved in the design of the online environment, particularly in understanding the processes of learning and how they can be supported. Also, SRL as applied in the MSRDL (Andrade & Bunker, 2009) guided to professors in the design of the individual task, particularly to analyze the steps that the students should follow in order to finish a task, and improve the design of each task and the support provided so that students can develop as independent learners.

- Data collection: Self-regulation related items were used to collect data about students' experiences of the TELE with items utilized from the items from the Motivated Strategies for Learning Questionnaire (MSLQ) (Pintrich, Smith, Garcia & McKeachie, 1991). Items like: "I prefer class work that is challenging so I can learn new things" and "Before I begin studying I think about the things I will need to do to learn" were basis to develop focus group questions for students like: "Do you feel like you have choices about some aspects of this subject?"; "How motivated do you feel to work in your tasks in this context?"; "Did you feel that using the TELE changed your need for support? and "How do you think a TELE can change the face to face interaction of PE?". Also items like: "When work is hard I either give up or study only the easy parts" and "I am sure I can do an excellent job on the problems and tasks assigned for this class" were utilized to create questions like: "Does using the TELE help you to work like a student in a different way? and "Was the independence to work in the TELE an issue for you?".

3.2.3 Design-Based Research

This study followed the Design-Based Research (DBR) (Reeves, 2006). Wang and Hannafin (2005) defines DBR as a "systematic but flexible methodology aimed to improve educational practices through iterative analysis, design, development and implementation, based on collaboration among researchers and practitioners in real-world settings and leading to contextually-sensitive design principles and theories" (p. 6). In order to achieve that aim, close collaboration between researchers and participants in a DBR process is needed across an iterative four-stage process (see Figure 5).
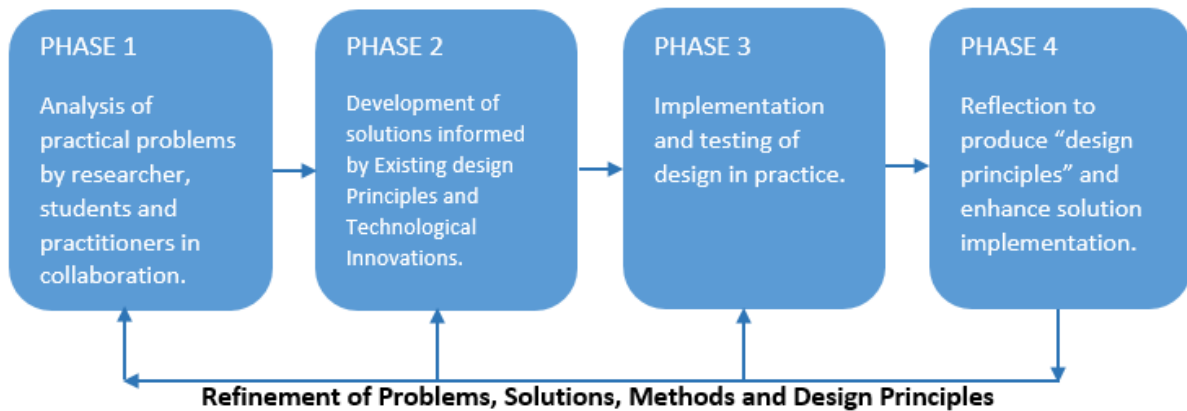
Figure 5: Iterative four-stage process for DBR process (Reeves, 2006).

DBR's four phases process is described by Amiel and Reeves (2008):

> The practitioner is seen as a valuable partner in establishing research questions and identifying problems that merit investigation [Phase One]. Next, a design [Phase Two] for the learning environment is proposed to address the concerns. The development of design principles will undergo a series of testing and refinement cycles [Phase Three]. Data is collected systematically in order to re-define the problems, possible solutions, and the principles that might best address them [Phase Four]. (p. 35)

DBR's aim to research within real world contexts has been utilized in a steadily growing base of studies over the last decade (Anderson & Shattuck, 2012; McKenney & Reeves, 2013). The adaptability of the DBR has been demonstrated with use in a variety of learning domains including natural and social science, medical and engineering, and technological sciences (Zheng, 2015). Furthermore, DBR has been utilized across a broad spectrum of educational levels from preschool to K-12 and higher education (Zheng, 2015; Anderson& Shattuck, 2012). DBR is an appropriate and relevant method for studying instructional technology in higher education (Reeves et al., 2005; Shavelson, Phillips, Towne & Feuer, 2003) because of its focus on the following:

Research on complex, real world problems. The context is an important variable (Barab & Squire, 2004) and many research approaches do not place enough value on the real-life context, which can lead to an incomplete understanding (Brown, 1992). Examining each specific context can allow for an enhanced understanding of the relevant aspects of the research as they apply in different settings. Furthermore, Wang and Hannafin (2005) state that innovations related to teaching-learning have little direct influence on practice if they do not relate to the real-world setting. For Shavelson et al. (2003), "the strengths of design studies lie in testing theories in the crucible of practice; in working collegially with practitioners, co-constructing knowledge" (p. 25).

Interaction between practitioners and researchers. Unlike other research methodologies, DBR integrates the research and the design process (Wang & Hannafin, 2005) with a "continual interaction between practitioners and researchers throughout the entire research process" (Cotton, Lockyer & Brickell, 2009, p3). That interaction is important because it allows for the researcher to be aware of critical elements, such as a school's organizational culture and the impact on the research being done (Anderson & Shattuck, 2012).

Integrating known and hypothetical design principles with technology. The DBR approach may be particularly useful when researching the area of technology (e.g. TELEs), since DBR can develop contextually based theories of learning and instruction, while increasing the capacity for educational innovation (The Design-Based Research Collective, 2003).

Maintain a commitment to theory construction and explanation. DBR is not just about designing interventions. DBR utilizes theories about teaching and learning, reflecting a commitment to understanding the relationship among theory, design artifacts and practice (The Design-Based Research Collective, 2003).

Finally, using DBR advances design, research and practice concurrently (Wang & Hannafin, 2005) while engaging participation from the researcher in the design, development and implementation of the project (Barab & Squires, 2004). While this collaborative approach could be viewed as biased and challenging researcher trustworthiness and assertions (Barab & Squires,

2004), the researcher's immersion in the process could be considered at the same time as a great tool from DBR (Anderson & Shattuck, 2012). Specifically, in the context of this study, the depth of information that DBR enables can assist in understanding the effectiveness of a particular course design, as well as, the complex processes that allows students to self-regulate in a new and more autonomous educative environment.

3.3 Case Context

This study was conducted in a Faculty of Physical Education Teacher Education at a public University in México: The Autonomous University of Chihuahua. As a public university in México under government support, there is a guiding principle that all students who apply will be provided a place within the university. This 'open door' policy could create issues with academic quality; as students with admission grades under the minimum level are accepted regularly and commonly possess low levels of self-regulation for learning.
The Mexican educative model is heavily labeled as a permissive one. At the primary level, students can progress from first to sixth grade without academic evaluation and need to minimally attend class (DOF, 2013). This approach of limited evaluation continues to a certain degree at the university level where students can be admitted, at least within this faculty, regardless of their admission score. Furthermore, Mexico is one of the leading countries in public spending on education globally. In 2011 Mexico spent more than 20% of its public budget on education, compared with the OECD average of 12.9% (OECD, 2011). While spending on education can be viewed as high, students' results in Mexican education are below the average in mathematics, reading and sciences (OECD, 2014).

In México, the Secretariat of Public Education (SPE) recognizes an academic program as one with quality giving scholarships to students. At the time of this research, no *online* bachelor degree attracts a scholarship from the SPE; and only one online degree offered in postgraduate education has SPE scholarships available. The AUCh is offering some form of online education (either partially or an entire degree) within 6 of its 15 faculties: Accounting, Philosophy, Legal Culture, Nursing, Engineering and Politics Science. To date in Mexico, there are no Physical Education Teacher Education degrees offered fully online (UNADMEXICO, 2018). Due to the

lack of a fully online degree, PETE's programs using online education does not yet have a presence within the educative system in México.

However, the AUCh is a prime location and educational institution for research into the design and implementation of a new online approach to take place. First, AUCh is developing its online education within Mexico due to the focus on massification. In addition, AUCh is working under an academic model that aims to support the students' motivational skills for their learning, such as self-regulation and self-determination, as stated in the AUCh's academic model: Students must learn to self-regulate (AUCH, 1998); which would align with the need for students to be independent learners in an online program. However, even when university has indicated a desire to reach that self-regulating aim, and follow SR and SD theories for their academic' model; that is more a global concept with no totally applied models, since students' academic path and evaluation system still depends on locked times and process; and not about their own self-regulation. Therefore, the theories of self-determination (Deci & Ryan, 1985) and self-regulation (Pintrich, 1995, 1999) lend themselves strongly with choosing this University to conduct this research.

3.4 Design of the Study

The application of the design-based research follows a version of the DBR process adapted for the time constraints for a PhD study in that the design solution was only implemented once in Phase Three rather than through multiple iterations. A summary of each phase as it was implemented is presented in Figure 6 and described in the text below. This overview is followed by more detailed descriptions of the preparations and trialing of the methods (Section 3.4.2) and the implementation of the research (Section 3.6).
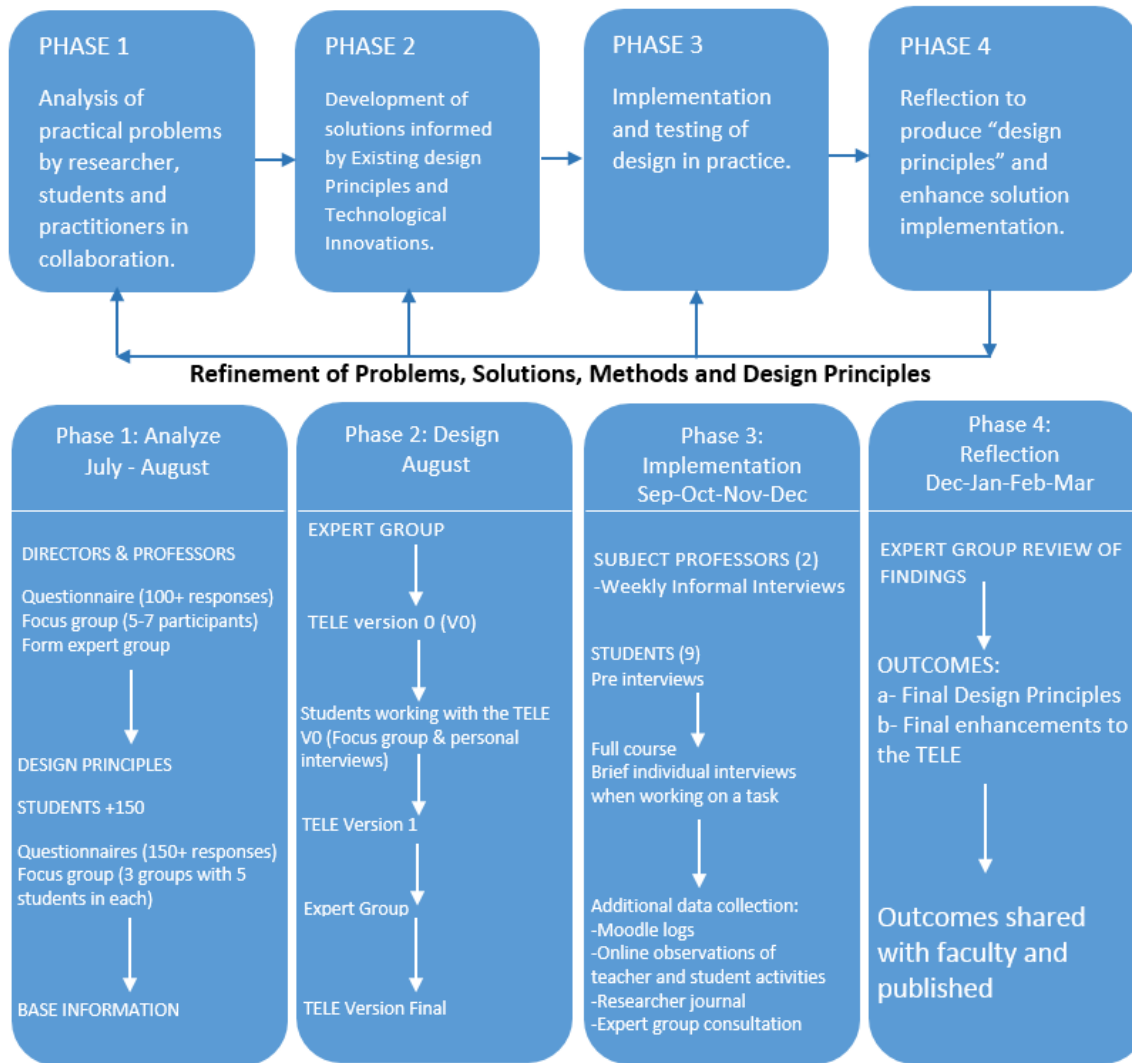
Figure 6: Adaptation of Design-Based Research for this study (adapted from Reeves, 2006).

Phase One in DBR is an analysis phase in which researcher and participants in collaboration analyze the practical problems that merit investigation (Reeves, 2006). In this study, the purpose of Phase One was to collect information from professors, students and other Faculty staff about the possibility of using a TELE in a subject within the bachelor's in physical education degree. Furthermore, findings from this phase would be used as information in Phase Two for the creation of the final version of the TELE.

As a first step, questionnaires were administered to all professors in the faculty and students from the first semester. The questionnaires included items about: online education background, thoughts about the faculty's teaching models using Self-Regulated learning strategies, how they perceive their self-determination, thoughts about using technology in education and everyday contexts (e.g., Bennett & Maton, 2010); dispositions and possible issues for studying/teaching in an online environment; use of internet and technologies or willingness to use it in class; dispositions to work in a new online environment; and how much do they support or believe that they are supported in the classroom. See the first section of Appendix 1 and 2 for the items.

The next step was to conduct focus groups with each participant group to elicit more detailed responses than those available from a questionnaire. The focus group interviews covered questions about teaching and learning experiences, opinions about online education and whether they were interested in TELEs. A semi-structured protocol was used, with open-ended questions, to guide the discussion but to also allow it to go where participants wanted to. See the first section of Appendix 3 for the focus group questions for Phase One.

The Expert Group was also formed in Phase One to provide support for the process of designing and implementing the TELE. The information from focus groups and questionnaires were presented to the expert group, for peer review strategy, and used in Phase Two to assist in the design of the TELE.

Phase Two in DBR is the development of solutions based on design principles and technological innovations (Reeves, 2006). In this study, the purpose of Phase Two was the development of the online subject (the Gymnastics 2 MS) within the institutional Moodle system. Evaluation occurred in focus groups, during which students learned about SD and SRL. First, students

received general information about Self-Regulation and Self-Determination process (e.g. steps for each process). Then, specific information about each process was presented. Self-Regulation as an actually every day applied process, and as one skill able to be learned. Self-Determination was presented as a continuum of aspects, both externals and internals, which could influence motivation and how inherent satisfaction could be more important that external rewards (e.g. grades). After that, students were asked to think about those processes of SD and SRL and how they use them in both academic and non-academic's settings. Most students show clear examples of SRS on everyday activities (e.g. reach and sport goal) and how SD was also utilized in their non-academic life (e.g. doing their tasks in autonomous behavior). Furthermore, students were asked about how those processes could be transferred from those non-academic's settings to educational environments. Students used a draft version (Version 0) of the MS, and suggested refinements and/or changes, via a member check strategy, to obtain the workable version (Version 1). The expert group used those suggestions to make the final adjustment and obtain the final version (FV) implemented in Phase Three. From 12 students in Phase One, 11 agreed to work in Phase Two and one dropped out of school.

Phase Three in the DBR is about the implementation and testing of design in practice (Reeves, 2006). The purpose of Phase Three was to evaluate and test the TELE's design in an authentic educative setting. Moving to online learning was seen as a risky transition for the faculty's Dean, so he wanted to trial the TELE by only allowing a maximum of 10 students to be engaged in a class before any possibility of using it in the future with the full cohort. From the 11 students in Phase Two, 8 agreed to work in Phase Three with 1 more student enrolling after the start of this phase. As a result, the total number of students enrolled in Phase Three was nine.
Data were collected within this phase through quantitative data from the Moodle system and informal interviews with professors and students; before, during and after the use of the TELE. The quantitative data obtained from the Moodle included the frequency of visits, time spent working with the site and what resources were used by the student.

Phase Four in DBR is a reflection phase which is focused on enhancing the design and production of design principles. Phase Four was intended as a review of the findings and to determinate the final design principles and enhancements to the TELE. All findings were

discussed with the expert group to assist with interpretation and help to ensure the study's quality. As noted, this was the last phase for this PhD study, but the design principles utilized in the TELE will continue to be refined as new goals arise for future work in other subjects. The final outcomes will be shared within the faculty and through publications, including the final thesis.

3.4.1 Ethics Approval

Ethical approval was obtained from the University of Wollongong Human Research Ethics Committee prior to the study (see Appendix 4 for the approval letter).

Participants received a Participant Information Sheet prior to the beginning of the study, which provided an overview of the study, research objectives and their potential role in the study (See Appendices 5 and 6). Furthermore, all participants provided their consent in writing (See Appendix 7 and 8) and were provided with a withdrawal form to be used if a participant wanted to withdraw from the study (See Appendix 9).

3.4.2 Preparation and Trialing

In preparation for the implementation of the research study, initial conversations were held with the faculty's authorities (i.e. Principal and the Academic Chairman) about the general idea of using technologies in a PETE program. These discussions were important for identifying potential issues and obstacles, and for convincing the administration to allow this study to commence. It should be noted, that the administration within the FSCF would only allow a maximum of ten students to be involved in the study because they felt there were some risks with this kind of innovation and that those risks could be better handled if only a small number of students participated and that professors would feel more comfortable working with a small group. As a further measure to address these concerns students and staff were involved in preparations for the main study that included questionnaire develop and the creation and testing of a trial TELE before the main study commenced.

Questionnaire Development

In order to obtain information regarding participants' thoughts about using technologies, 40 professors and 40 students, who were not part of the main study groups, were asked to complete a first trial version of a questionnaire focused on the use of technologies in a PETE. Those 40 professors and 40 students were different to the 65 that took the final version of the questionnaire later on Phase One. Professors' total number at study's time was 120. The pilot aim was to survey at least 40 professors (30%) and 60 (50%) for the final questionnaire. The final number of 65 was the number of returned questionnaires.

This questionnaire was based on previously used questionnaires about the use of technology in the home (e.g., from Mexico's National Institute of Statistics, INEGI, 2015) and was modified with help from the expert group to align with the study focus on education. With the responses from initial sample of professor and students and the help from professors Humberto Blanco Vega and Imelda Alcala-Sanchez, both experts in the design of questionnaires, some changes were made in order to clarify some questions and areas of confusion for professors and students. After those modifications, professors (Appendix 10) and students (Appendix 11) trialed the questionnaire. It should be noted that 2 and 4 items were added from the first draft for professors and students respectively. The reason for the changes to the questionnaire was that responses indicated that the concepts of autonomy, self-regulation and teaching and learning in class were not evident. In addition, the trial application of the questionnaire identified some issues with item clarity (e.g., questions that were not explicit). An example of the kind of changes that were made, item 9 on first trial questionnaire was:

Item 9: Your subject could be considered:

Theoretical ( )   Practical ( )   More theoretical than practical ( )   More practical than theoretical ( ) 50%Theory50%Practice ( )

This item was modified based on the experts' observations that some subjects did not fit into the original five options. As such, item 9 became item 17 in the questionnaire and was modified to include more answer options:

Item 17: Please check the % that your subject is more practical or theoretical:

Please mark the % in that your subject is more practical or theoretical				
Subject 1 100% Theory	75%Theory	50% Theory/50%practice	75% practice	100%Practice
Subject 1 100% Theory	75%Theory	50% Theory/50%practice	75% practice	100%Practice
Subject 1 100% Theory	75%Theory	50% Theory/50%practice	75% practice	100%Practice

After the changes to the questionnaire were made a second trial was conducted with different group of 50 professors and 44 students to ensure the concepts of autonomy and self-regulation were covered. The decrease in sample size was attributed to those participants that returned the surveys. After receiving no suggestions and/or revisions from both professors and students, the final version of the questionnaire was ready to apply in the Phase One of the study (see Appendices 1 and 2).

Trial Version

At the same time as the questionnaire development, the lead researcher engaged with faculty members (e.g., subject's professor) and applied the Moodle Platform in order to create a trial version of the Moodle Platform as TELE's online support (see Appendix 12). This trial version was used as a demonstration for the professors, students and faculty staff to illustrate how a practical subject such as Gymnastics could be taught with online support. Following Van Teijlingen and Hundely's (2001) reasons for conducting pilot studies, the intent of this trial study was to test the feasibility of the study's approach within a specific context; helping with the development and adequacy of research instruments; and identify logistical problems as well as modify elements that would facilitate a realistic and workable study. The Moodle trial testing was created based SDT and SRL principles, and with assistance from the subject's professor.

The trial version provided the following initial data and information:
- Students' SRL skills: The TELE required students to take more responsibility for the educative process by making them responsible for setting activity deadlines (SRL), choosing which technology tools to use based on their capacities (SDT: competence) and deciding the steps and actions taken in most of the learning activities (SDT: autonomy).

- Online materials: A diversity of online materials (e.g., visual, video, audio, written) allowed for students to be supported in their motivation to complete a variety of educational tasks.

- Classes: The TELE provided students with autonomy to decide when and how to work on each task; while facilitating the development of Self-Regulated skills. Also, if students decided they needed more specific instructions than the ones from the online materials, they could use technologies (e.g., WhatsApp video call) to watch the instructor in real time or even coming to the faculty and watch the professor teaching the movements in a gymnastic class.

- Schedule: The main goal for students was to cover the theoretical and practical gymnastics exercises themselves and then teaching those exercises to other people. This required students to demonstrate SR skills and a commitment to working without regular weekly reminders or deadlines.

- Assessment: The TELE system allowed students to choose from a diverse list of assessments (e.g., theoretical or practical) (SDT: competence), as well as a variety of ways that each assessment could be submitted and graded (SDT: Autonomy).

The trial utilized an initial cohort of 12 students (male=8; female=4) and one professor from a Gymnastics subject. These trial participants were chosen because they were required to retake the Gymnastics subject due to failing the subject the previous semester. Instead of completing the Gymnastics subject again later in the year, students were offered the chance to take the subject as a special instance during the academic break. Under the guidance of the expert group, face to face discussions were conducted with the professor and the students about their experiences of using the TELE; also, online discussions were conducted via platforms such as Facebook. That triangulation and peer review's strategies were utilized to ensure the rigor of the study.

During this trial, a number of technical issues were identified, and modifications made for future implementation. First, uploading of video within the university-supported Moodle site was not feasible, so students were asked to use YouTube as the provider to upload their videos showing them teaching the gymnastics exercise. Second, students requested that motivational prompts and advice/guidance elements be embedded within the Moodle platform. However, since AUCh's

Moodle system does not count with prompts, I opted to send personal messages to students via Moodle's messenger service. While sending messages to students did allow for an enhanced connection with student, the lack of real time response and automation could have been viewed as a concern for the professor who would be teaching the class/subject. All the issues and changes supported the mains purposes of this trial which were to understand the possible issues when using technologies in a PETE program and prolong the researcher's engagement with both the research's place and participants.

The trial study identified five considerations needed for the main study:

1. The questionnaire responses indicated that professors and students did not negatively perceive the use of technology in a PETE program, with 60% reporting an interest in using technology for technological and pedagogical support. But 80% of students did not believe that the practical part of a PETE subject could be successfully completed in a virtual class. This suggested that professors and students might feel comfortable with technology generally and for teaching and learning, but there were some doubts about whether it could be used in PETE. For the main study, the same platform (Moodle) that students already used for other subjects was utilized. Also, specific examples of TELEs that included sports and physical activity content were presented to participants.

2. The trial students seemed initially interested in taking the subject as this special instance. For example, one said, "I am interested in that class because this way I could save having to take it the next semester" (Participant first trial, Facebook conversation). However, the sole opportunity of passing a delayed subject did not facilitate enough internal motivation to re-enrol as only one student completed the subject. The other nine did not finish the subject, and the remaining three students were involved in a limited manner. This suggests that a close understanding of student's motivations to participate and constant reminders/guidance about the subject activities may improve the student retention rates. Furthermore, teaching students the basics of self-regulation learning for working in more autonomous environments should be provided.

3. The increased affordance of student responsibility seemed to clash with the experiences and expectations of students. In particular, one student revealed a desire for more structure around the deadlines of assessments:

The idea of us having to say when we will send the homework… that's the main reason to quit. I believe that only for an exam via Skype that would be ok, to send a date, but not for the regular homework. If it had not been for that, I believe that I could have been finished all the class. (Participant first trial, Facebook conversation).

This data set suggested that students may want to receive the benefits of the autonomous experience and be allowed to make the main decisions about some aspects of a subject yet also needed to feel that the responsibility was not completely on them.

4. Only one student finished the program and from the professor's evaluations passed the course. At one point during the trial the student who completed the course asked me to allow him to see "what tools may I need to finish this task" (Participant first trial, verbal comment) and did not start the task until he was sent the schedule tool with the SRL strategies, such as help-seeking. This example could illustrate that the student was adopting Self-Regulated learning strategies, such as planning and help-seeking.

5. None of the trial students indicated a desire to be involved in a similar teaching and learning setting in the future. Students did not seem to demonstrate the level of interest and/or motivation toward using the online technologies that their questionnaire responses might have suggested. A possible explanation is that social bias could be present in the questionnaire responses and that, for most of the students in this trial, using technologies was not what they expected from this PETE program.

Overall, the trial testing showed that both professors and students consider technology as an important tool into the everyday life and even for academic purposes. However, the transition from identifying the desire to teach and learn in an online setting and the application of such an educational experience was more difficult. There was an inherent conflict between the level of control of the professor and student within the educative process. In addition, the AUCh seemed not to be 100% ready, technologically or pedagogically, to go completely online with a PETE program. The information gained in the trial helped to prepare for the main study by collecting background information on the context and helping to develop some of the materials and supports for the TELE.

3.5 Participants and Recruitment for the Main Study

Students: After ethics approval was granted from the University of Wollongong Human Research Ethics Committee, participants for Phase One were recruited from an informal discussion in the Faculty while attending classes, about the proposed research study and their potential involvement. During that initial meeting, students completed the consent form (See Appendix 7) and a voluntary questionnaire (See Appendix 2) asking students their thoughts about online education and the possibilities (positive and potential issues) of using this form of pedagogy in a PETE program. During the initial meeting, 24 students (males=16 and females=8) expressed their interest in participating further in the research by leaving their contact details (e.g., telephone number, email, student number). All interested students were contacted to participate through a series of focus group interviews (Phase One focus group interview).

Upon completion of the focus group interviews, 12 students (males=10 and females=2) volunteered to be part of the design and implementation (Phase Two and Three). From 12 students in Phase One, 11 agreed to work in Phase Two but one drop before starting the phase. From 10 students going into Phase Two, 8 agreed to work in Phase Three with 1 more student enrolling after the start of this phase. As a result, the total number of students enrolled in Phase Three was nine.

The participants were recruited from the undergraduate PETE program at the AUCh, México. Requirements for involvement within this study were students needed to be enrolled in the second semester subject titled 'Gymnastics 2' and have been involved in the subject 'Technology and Management of Information'. The reason for requiring students to have taken 'Technology and Management of Information' was that this subject provided experience with Information and Communication Technologies (ICT) and the University's Moodle platform. The reason for requiring ICT experience was that this would potentially reduce the difficulties faced by students without experience in online learning (Harris et al., 2010).

Professors: All the 120 professors from the FSCF of the AUCh were invited to participate by answering an initial questionnaire in Phase One (See Appendix 1) whereby 65 professors answered the questionnaire. Results of the initial questionnaire indicated that the most commonly used pedagogical approach within the FSCF is face-to-face teaching (77%, n=50). Furthermore,

50 professors (77%) indicated that they thought that even if all technical and educational aspects were covered, online education could not be the same as in the classroom. The fact that the FSCF does not have any official subject in the university´s online system, even when the University offers the opportunity to have four online subjects, is an example of where the progress of online education is within this faculty. Professors indicated pedagogical implications as potential difficulties of online education within PETE. This statement and claim is supported by research about the importance of and difficulties of teaching in online education (Dabbagh, 2007; Keengwe & Kidd, 2010; Muñoz, González & Hernández, 2013; Sammel, Weir & Klopper, 2014). Understanding the range of perspectives through the anonymous questionnaire was important to validate, support and/or refute these assumptions. The two professors teaching "Gymnastics 2" had volunteered to be the lead teachers within this study who would engage in the design, implementation and evaluation of the TELE. Most of their data was collected during Phase Two and three of the study.

The researcher as a participant: As a graduate of a Physical Education bachelor's degree, active member of the laboratory for the Educative Innovation in the FCCF and Associate Professor within the FSCF, I as the researcher, played an integral role across the PETE program. As noted above within the DBR section, the researcher takes multiple roles as designer, advisor and facilitator. As a designer, I participated in the design of the Moodle platform used within this study. While I was a designer, I was supported by both the subject professor and by the University's experts on the Moodle platform to ensure that the pedagogical aspects worked in online education. At the same time, that was the first time that the technological staff of the University (CECAD by its Spanish acronym) had worked with online education for a PETE program. In regard to this element of the project, I was an advisor helping to shape the university's platform to the subject requirements (e.g., solving the problem of how to upload videos). Finally, I was a facilitator for students. My aim was to not be viewed as an authoritative figure just giving knowledge; but more as a facilitator helping students to construct knowledge (see Russell, 2013).

3.6 Research Procedures

3.6.1 Phase One: Analysis of practical problems by the researcher, students and practitioners in collaboration

After the initial trial and in accordance with the DBR process Phase One began. The purpose of this phase was to collect information from professors, students and Faculty staff about the possibility of using a TELE in a subject from the bachelor's in physical education and use that information in Phase Two for the creation of the TELE's final version.

One of the requirements of the Higher Degree Research committee at the University of Wollongong was to begin the research by having a signed letter from my faculty giving approval for this research. From those very first moments, it was possible to detect possible barriers to working with online education within this particular Physical Education Faculty. Most of the ideas from the Faculty staff reflected the view that: "The professors of this Faculty will not work with technology" and "The students are not ready to work online" (Faculty's Academic Chairman, Interview, Phase One). Initially and with little information to support or refute the use of technologies in a PETE, there was a clear resistance and deficient mindset for the use of technology in PETE. After assuring the faculty management that I would work together with the Technological Staff of the University (CECAD by its Spanish acronym) for any technical requirements, I received approval for the project with only two requirements: 1) the maximum number of students allowed to participate in the research would be 10 and 2) consultation with the Faculty's Academic Chairman to be sure that the project did not present any academic issues that could conflict with the University's academic regulations (e.g., have the mandatory three examinations during the course).

In the meantime, I kept working with the Associate Professor who agreed to participate in the research within the subject 'Gymnastics 2'. The professor had worked with me in the trial phase and in previous technological projects and I knew he possessed a positive belief system about using technology in Physical Education. The Associate Professor and I agreed that it was feasible that subject could be taught online. 'Gymnastics 2' is a second semester basic subject that consists of five units and a workload of four hours per week (2 hours each of theory and practical). The reason for choosing this subject was because: (1) it is a basic subject for this

Faculty (in both Bachelor degrees); (2) the program includes both theoretical and practical tasks so we could see how the students worked with both types of content. The ability to examine the difference and similarities between theory and practical is important given that 80% of respondents from the trial questionnaire did not believe that the practical component of a PETE subject could be successfully delivered in a virtual class; and (3) this subject included all three University based competencies (*Basic*: sociocultural and problem solving, *Specific*: Physical education, sport and recreation, and biological fundamentals of sport and *Professional*: Basic conceptual elements). In both theoretical and practical activities, the assessments for the students were written assignments, group discussions, team expositions, written and practical exams, and a final presentation of exercises.

In the first part of Phase One, questionnaires were finalized for professors and students. For the professors, the aim of the initial questionnaire was to identify 1) use of technologies (e.g. Internet, WhatsApp) or willingness to use in their classes, 2) their disposition to working in a new online environment, 3) issues that they thought could be a problem for working online and 4) their ideas about SD and SRL, and how much they supported both in the classroom. The professors' questionnaire included some items about SDT factors (e.g., What does autonomy mean to you? How do you promote it in your class?) and SRL (e.g., What does self-regulation mean to you? How do you promote it in your class?).

For students, who were an integral part of the solution for our problem, the aim of the questionnaire was at first the same as for the professors, but also to collect important information about their online education background, thoughts about the professors´ teaching models, whether they used SRL strategies, in both academic and non-academic settings, how they perceived their SD, their thoughts about using technology in education and everyday contexts (e.g., Bennett & Maton, 2010) and their dispositions to and possible issues with studying in an online environment. The questionnaire was designed to capture the perspectives of a large number of students at a general level (see Appendix 2).

After a couple of weeks of waiting for final agreement from the University to commence Phase One, I engaged in discussion with the Academic Secretary to see what had happened with the

approval for the research project. To my surprise, I was told that the new instructions from the Central Academic Unit were to begin the research about online education in all the faculties. This suggested that there was new interest from the university administration in online education and the outcomes of this research study. As a result, the approval to conduct the study was provided. At this point of the study, it was critical to begin the analysis process to inform the development and implementation by interacting with professors, students and staff.

Data Collection using Questionnaires and Focus Groups

As part of the bi-annual faculty meeting, I made a brief presentation about the project, answered questions and informed the professors that I would disseminate the questionnaire (See Appendix 1) to all professors over the next few weeks. After a week, over 150 questionnaires were handed out and 65 completed copies were returned.

For the students, I disseminated the questionnaire (See Appendix 2) in the 'Gymnastics 2' class with the professor of the subject present to address questions from students. A short explanation of the project and the aim of the questionnaire were provided to students in a classroom setting. Students were told that engagement in this project would have no impact in their academic progress and would be used to enhance the potential educational opportunities of students in the future. A total of over 70 questionnaires were handed out to the class of 90 students. It should be noted that five students chose not to complete the questionnaire. As a result, a total of 65 students completed the questionnaire. The questionnaire allowed me to collect data from most of the participants to provide a general understanding of their perspectives (see Appendix 1). This information was used as a basis for beginning the focus groups. The role of the focus group was to try and provide more depth and detail about the information obtained from the questionnaires.

One focus group was created with seven professors randomly chosen from a pool of volunteers who completed the questionnaire and indicated they would like to be interviewed. Focus group questions (see Appendix 3) asked for further detail about the opportunities and issues associated with TELEs that professors and directors identified in the questionnaire. The focus group was based on the following sample questions in Phase One:
- What sort of choices have you made (in the annual meeting) about your subject?

- How successful do you feel you are as a teacher?
- Do you feel as a teacher that online education is a context where you can be successful?
- How do you support self-regulation in your students?

Upon completion of the focus groups, additional interviews were conducted using a similar format based on the availability of participants. Specifically, two interviews were conducted in pairs and three interviews were conducted individually.

Two focus groups were conducted with 3 and 4 students respectively. Questions asked students for reasons why they preferred PE to be taught in a particular way (e.g., online vs. face-to-face) and what students felt was beneficial to their academic success. The focus group was based on the following sample questions in Phase One:
- How motivated do you feel in school?
- How do you feel about voicing your opinion with your classmates?
- How do you think a TELE can change the face to face interaction of PE?
- Do you think that motivation will be better or worse online?

Similar to the focus groups conducted with the professors, further student interviews were conducted individually or in pairs with 4 students. The intent of these interviews was to allow students to be more comfortable in sharing their ideas, utilize strategies that ensure the rigor of the study (e.g. peer review and triangulation) as well as allowing for additional ideas to develop after the initial focus groups.

Design Work

During Phase One, I had meetings with the professor in charge of running the 'Gymnastics 2' subject. These meetings focused on understanding the project as a whole and deciding what changes must be made to the program to convert a face-to-face subject to an online version. Specific concepts discussed within these meetings were around the infusion of self-regulation/self-determination and design principles into the specific subject. The professor and I agreed that the TELE must enable students to self-regulate by including assistance/tools to

develop self-regulation skills and providing control over the self-regulation process, both of which are needed to assist the students improve their academic success (Little, 1995; Brown & Hirschfeld, 2007; Thang, 2005). In terms of self-determination, discussion occurred that focused on how students' needs for autonomy, competence and relatedness could be supported by the professor. Much of these conversations were focused on identifying how the principles espoused by the work of Reeve (2009) could be used within the TELE.

Herrington and Reeves (2011) stated that design principles are "recommendations for design that enable teachers and instructional designers to use well-researched ideas as guidelines for their own efforts to enhance student engagement and learning outcomes" (p. 595). The professor and I followed the design principles suggested by Oliver (2000) to design web materials using new technologies, such as creating authentic assessment activities. Furthermore, some design principles were used based on the recommendation of the CECAD and Technical Design Principles, such as determining the subject's feasibility to go online, addressing some pedagogical issues associated with the professor, student and designer (Herrington et al., 2007). For a full list and explanation of those design principles see Appendix 13.

After much discussion and collaboration, the professor felt that the TELE was ready to be implemented/trialed but was concerned about what elements within the subject could be modified as the class progressed, as well as the potential success of the class:

> Professor: Actually, the program is ready, but in the real practice we change and use other strategies. The program is made in a collegiate way, just because it is a requirement. However, we change the strategies.
> Researcher: That sounds like a hidden curriculum to me.
> Professor: Sure, because the actual program is weird and cutting edge. You are going to do this and that, and the notes are this and that; and you have until that day or you fail. All is conditioned and totally limited, but, well I hope, that the online brings something positive (Professor G, Interview, Phase One).

The next step required collaboration and input with the Coordination of Continuing Education, Open and Distance (CECAD) to create a platform within the University's Moodle system. The

CECAD is the university's center for supporting faculties with all the ideas related to the use of technologies and flexible academic modalities. The initial conversations focused on the different educative modalities that they could support/provide for students which were semi-present, blended and pure virtual. The specific type of educative modality could be used to meet the needs of the student, professor and faculty. These initial discussions revealed the lens that the CECAD initially possessed regarding the creation of an online subject within the PE domain:

> First, we have what is the pure virtual platform, but I don't believe that could be the one for your Bachelor course because of the practical part. For pure virtual we are talking about a relationship between student and professor where there is no need to know the student… they do not download any practical part. In this case [physical education] there is a need for the practical part. (CECAD member, Personal Interview, Phase One)

The point about requiring a physical face-to-face interaction for the practical part of the subject (e.g. TELE) was a permanent concern for professors within this Faculty where students went out to practice with scholars' groups in primary schools by semesters five and six. During Phase One interviews professors showed concerns about, how to evaluate students' practice outside the Faculty? "I send my students to practice in real-world schools a lot. How can we know if student is really doing what is on the planning sheet? (Professor A, Interview, Phase One). The actual supervising process for students' practice, rely on the written report from the supervising professor on the student's practice school.

From this lack of face-to-face concern, a plausible solution was to use video to cover that aspect of the PE practice, both as a recorded video or with a live video call. In the trial TELE video was utilized by the professor to illustrate to students how to teach a movement/physical activity. Students could send or have a real time video(s) to show how they had taught the movement to another person. These options seems to be a viable alternative for professors as they expressed that using a video call, could allow them to evaluate their students' performance during outside faculty practices.

However, the CECAD made it clear that the Moodle system in the University did not handle video well:

Yes, one limitation that we have is that we cannot handle videos, for space reasons it is complicated. But you can make a YouTube channel and put the videos there and link from there (CECAD member, Personal Interview, Phase One).

While the use of an external system was a work around, there was a problem associated with the extra step for the students to work within the system: students were *obligated* to access an external site (i.e., YouTube) and have part of their academic process reliant on a commercial and non-official platform, even when 49% (32) expressed their preference to take the online class in the University's official site. As such, the lead researcher made a note of the extra step and utilized this as a prompt for inquiry later in Phase Two. Addressing the video concern, much of the discussion was focused on the technical and pedagogical elements. Specifically, the discussions were focused on (a) the pedagogy used in a virtual environment, (b) the University's guidelines for online education, (c) the professor's experiences using the Moodle system, (d) the student perceptions and experience with the trial TELE and (e) the needs of the study/faculty to allow for the TELE to be successful as possible. Much of these discussions led to points that needed to be kept in mind when developing the TELE. One main request was since this study was grounded in the elements of Self-Regulated learning, the researcher and professor asked to have a system inside the Moodle platform that could guide students in their self-regulation process (e.g., the phases of forethought, performance, self-reflection etc.).

Upon completion of these discussions with the CECAD, there was an agreement to assist in the process: I do not see any problem so far. Is something…how can I say it? I am very much interested because this is physical education! It is interesting to see how to take a course from physical education into the online modality. (CECAD member, Personal Interview, Phase One) While the assistance from CECAD could be attributed to their ability to provide support within the current infrastructure, there was also an undercurrent of excitement about trying this innovative project:

> Be ambitious here and build the capacity of all the professors [from our Faculty] and make one analysis of the feasibility for subjects to take them online. With that could be a bigger, more complete project, with more impact. We are delighted; especially because we will learn from you. (CECAD member, Personal Interview, Phase One)

An illustration of the collaboration and focus on innovation is provided below which comes from a conversation with a member of the CECAD:

> Ok, I see your course with the four lineal tasks. Maybe we need to put it in units and add some forums… all that instructional design and the didactical sequence. It is important not to confuse the virtual modality with the open modality… we are working in an academic model that obeys a calendar. Also, the answer is an outright yes! Especially, I'm very happy and interested in innovating. We will work this week to finish the course and begin the project. Also, to break a little the scepticism from the authorities. (CECAD member, Personal Interview, Phase One)

After the Phase One meetings with the CECAD and demonstrating what was done on the trial TELE, some concerns were evident between the researcher and professor. The main concern is articulated in the following conversation:

> Researcher: Professor, your first impressions?
> Professor: Well, on the one hand it is good that they opened the doors to make this project happen, but it is a little confronting with the… Self-Regulation? (The professor is still not familiar with the word.)
> Researcher: "Self-regulation?"
> Professor: "Yes, and well, it seems as if they wanted us to do the same as in the classroom [with dates, etc.] but in a virtual way. However, that is not the purpose. We must talk with them and come to a consensus, to do it the way it must be done".

It was at this point within the study that we were ready to move on to the actual design of the Moodle platform (Phase Two), but first we needed to wait for the CECAD to create a Moodle platform draft version (Version 0).

3.6.2 Phase Two: Development of Solutions Informed by Existing Design Principles and Technological Innovations

Phase Two in DBR is the development of solutions based on design principles and technological innovations (Reeves, 2006). In this study, the purpose was the development of the online subject

(Gymnastics 2 TELE) in the institutional Moodle system, grounded in the information obtained in Phase One. While the incorporation of the online principles informed some of the actual subject, the professor in charge of teaching the subject needed to ensure that the subject goals aligned with the faculty goal and were congruent with the subject tasks on the TELE.

Phase Two officially began when I received CECAD's Moodle platform draft version (Version 0). The TELE was designed using the SDT and SRL theories to support student's self-determined motivational responses (e.g., autonomy, competence, and relatedness) and Self-Regulated learning in different ways between the theoretical (e.g., create a text about teaching a movement) and practical (e.g., create and present gymnastics exercises using video) sections of the class. One problem with that Moodle platform version 0 was that the schedule tool (i.e., which would enable students to create their own schedule) was not yet in the system. After not being able to contact to the CECAD's experts and not having access to create a schedule by ourselves, the decision was made to add the schedule in the Moodle platform as a Word document (See Appendix 14).

Next, the professor and I decided that the Moodle platform draft version was ready to be reviewed as a formative evaluation. From here, 9 professors and 11 students who had participated in both focus group and Personal Interviews would work directly on the design and evaluation of the Moodle platform in order to make suggestions for possible changes. In addition, the expert group would provide advice and support associated with potential changes to the TELE. After learning about how this TELE was designed and how the concepts of developing Self-Regulated learning and self-determination processes (e.g., the schedule tool) were woven into the Moodle platform, the professors decided to wait until students engaged in the platform before making any suggestion or changes.

Students worked through this version of the Moodle platform whereby feedback and information were obtained through Personal Interviews and/or focus groups when possible. Initially, students were asked to see if they could log into the online system. This check of student access ensured that all students could get into the system at least one time without problems. Once in the system, evaluation began as students worked through the different sections and tools (e.g. TELE

messages system) within the TELE. In addition to navigating the Moodle platform, students received information about how specific actions within the TELE (e.g., working according to their own rhythm and pace) worked on specific factors associated with self-determination (e.g. competence) and Self-Regulation (e.g. schedule tool). Students also engaged in activities that utilized both self-determination and Self-Regulation outside (e.g. sporting goals) and inside (e.g. achieving a main goal through smaller goals) the academic settings. A final summary meeting was held to resolve and/or identify any possible doubts and issues associated with the current version of the TELE. That was a member check strategy to help to the rigor of the study. After those interactions students did not identify any changes needed on this draft version. Research has illustrated that changes occur throughout the development of online educational modules (Menchaca, Bischoff, & Dara-Abrams, 2003) these seems to be a lack of this during this study. A plausible reason could have been attributed to the student population. It is demonstrated throughout this thesis that the student population could be viewed as more toward the lower end of the self-determination scale. As such, low motivated students tend to provide limited feedback and will spend more time trying to get out of work then contributing to the development (Ntoumanis, et al, 2004).

Professors from the expert group were asked to provide their input and feedback associated with Version 0. Input and feedback were obtained through Personal Interviews with each expert group member. With no student changes, the expert group and professors confirmed this draft version as ready to use in Phase Three, which was the evaluation and testing in the real educative setting.

3.6.3 Phase Three: Implementation and Testing of Design in Practice

In Phase Three, nine students engaged in the online platform of the TELE as part of their 'Gymnastics 2' subject and conform one WhatsApp group to keep a record of their work; receive professor's reminders and helping to understand the process to be observed (e.g. triangulation) what helped to ensure the rigor in the conduct of the study. During the students' progress through the TELE and following their suggestion about not receiving reminders until necessary, weekly reminders were only sent to students if one of the following happened (1) one student sent their first task or (2) the official university/subject deadline occurred. The reason for the reminder criteria was because students believed they had the ability to stay on track during the subject, and stated that they did not need to receive reminders. For instance, student interactions/reminders

were programmed following the faculty's official dates for submission of subject related materials (e.g. September, October and November). That was a component from the traditional classroom that was utilized on the online part of the TELE to bring structure.

During students' work, Personal Interviews were conducted with each student when they submitted a task (e.g. October and November). It should be noted that 75% of sent tasks were completed in November which meant this is when most interviews occurred. Additional data was obtained through searching the Moodle log which gave details about how often students logged in; how long they logged in for, and which resources they were engaging with throughout the online subject. That data search helped to determine that even when most students stated they did not mind working in an online course yet did not have the time to appropriately complete the tasks.

Also, during Phase Three professors indicated their disappointment because even when they perceived, in general, that an online subject would not be an appropriate means for education, there was an expectation that some change in terms of student's work, motivation and engagement would occur.

Finally, an interview was programmed in the last week of classes for each student before starting Phase Four, not matter if they sent or not the tasks. A detailed description of students' responses and activities is included in Chapter 4.

3.6.4 Phase Four: Reflection to Produce Design Principles and Enhance Solution Implementation

The first aspect in Phase Four was to engage in conversations with the professor in charge of teaching the class. During those meetings, the lead researcher and professor reviewed and modified the design principles used within the TELE (e.g. not just reminders must be scheduled, but deadlines for tasks). Meetings with the expert group clarified how the design principles (e.g., students must have a Self-Regulation helping tool) must be applied not just in that subject but in others more generally in order to support further development of students' Self-Regulation skill.

Finally, a meeting with the faculty's Academic Chairman was held to present the findings and suggest possible future actions for using TELE in the faculty.

3.6.5 Data Analysis

In DBR, each phase provided a unique insight into the process of the development, implementation and evaluation of the TELE. Data was drawn from a variety of quantitative and qualitative sources. An audit trail strategy, a description of the research's strategies utilized on the study, was utilized during the whole research showing steps to collect and analyse data, record and process notes and organization and labelling of data. Data from Phase One utilized questionnaires that helped to identify problems to investigate and participants' perspectives and knowledge about the research purpose. Phase Two data was obtained by drawing on information from Phase One and layering further focus group and Personal Interviews of professors, students and members of the expert group. Phase Three and Four utilized interview techniques to examine the perspectives of each participant.

For qualitative case study research, data analysis is a "matter of giving meaning to first impressions as well as to final compilations" (Stake, 1995, pg. 71), to understand and try to interpret the meaning of the data (Creswell, 2003). Adapted from Creswell (2003), a general process for qualitative data analysis was adopted within this study for the analysis of questionnaire comments, focus groups, full interviews and quick interviews:

- From the beginning, the data was organized and prepared for the analysis, depending of the source of information. Qualitative responses from questionnaires, interviews and focus groups were transcribed into Microsoft Office Word.
- A general read through of all the data brought out reflections and gave a general sense of the information.
- Data was coded by organizing the material, creating categories and labelling them with terms (often from the participants' language).
- Settings and people were identified as categories or themes for analysis.
- The themes identified were represented and enriched with specific information, such as quotes and summaries.

- Interpretations were developed based on the researcher's experiences in the setting and by comparing the findings with theories or literature; and finally reviewed by the expert group and participants to obtain the final ideas.

Quantitative data from the questionnaires were transcribed into Microsoft Office Excel for the management of data. Descriptive statistics (means, frequencies and percentages) were calculated on all items collected within each phase.

Using both approaches, qualitative and quantitative, was intentional to bring a better understanding of the research; that approach is called mixed methods (Creswell, 2003). Mixed methods work under the foundation that each approach can support the other one, bringing new information or reaching a deeper understanding of the collected data. For example, within this study the relationship between approaches sometimes followed a quantitative to qualitative pattern depending on the appropriate method for collecting and analysing the data as aligned with the study intent. For example, after phase one's application of a quantitative approach (e.g. questionnaire) students expressed a limited understanding of what SR was. However, after a qualitative approach (e.g. personal interview) was utilized, a deeper comprehension of the data emerged (e.g. Students did not know the definition of SR, yet were applying these principles in other non-educative contexts).

Sometimes the relationship followed a qualitative to quantitative pattern:

During phase three, one student was questioned with a qualitative approach (e.g. personal interview) about why he doesn't utilize the Moodle platform, even just for login in. The student answered that he already logged into the platform and even sent some information. Data collected from the quantitative approach (e.g. student's Moodle login information) allowed for the verification that the student was not using the platform.

Mixed methods is a strategy also utilized within Design-based research as a viable way to analyze the outcome of one intervention (The Design-Based Research Collective, 2003).

In the present study, data analysis began from the first moment of talking with the participants. In Phases 1 and 2, coding was conducted using the participants own words to make an initial classification of the data. Also, the descriptions and settings of the people assisted to understand

their ideas and were part of the thick description' strategy that helps to ensure rigor of study. During each interview and focus group, the researcher recorded notes about the participants in the moment, to assist in understanding some ideas later during transcriptions and analysis. During each phase, as part of strategies to ensure rigor of the study (e.g. audit trail and peer review) preliminary findings were presented to the participants and the expert group to help the researcher to better understand the ideas and enrich the initial ideas that the data brought. Table 2 presents strategies followed to ensure quality and rigor of study. This was particularly true in Phase Four, when some ideas were new or complex, and the experts helped to advance the researcher's understanding and create groups and definitions for those ideas.

3.7 Quality of the Study

Regardless of the nature of qualitative or quantitative data, rigorous and systematic data collection and analysis is key to ensuring the findings are represented in an appropriate manner. Since this study was primarily grounded in qualitative methods and methodology, the concept of 'trustworthiness' is the most relevant when considering the quality of the research. The strategies listed in Table 2 were applied within this study (e.g., Merriam, 2002; Creswell, 2003).

Triangulation	The researcher utilized multiple sources and methods to collect data to confirm emerging findings. For example, this included comments from questionnaires and Personal Interview transcripts, as well as electronic data from the Moodle itself and electronic personal communications with participants. Sometimes even video recording of sessions was used when was necessary for a deep understanding of the process to be observed (e.g., focus groups) and when was expressly authorized by participants.
Member checks	The data and findings were presented to the participants in the study to receive feedback. This occurred during the whole process but especially in Phase Four, where experts and general participants were able to check their own and other participants' de-identified data.
Prolonged engagement	"The investigator is involved with a site sufficiently long to detect and take account of distortions". (Lincoln & Guba, 1985, pg. 302). The researcher was embedded in the context over a period of 6 months. He was close enough to the professors to have their trust and be seen by the students as a researcher and not as a professor.
Audit trail	A detailed account of the methods, procedures and decision points in carried out the study (Carcary, 2009) should be kept. All the steps followed on this research followed the DBR four phases protocol. This sets out a specific order to go through each phase and keeping that order, so any researcher can follow the process taken on this study. Detailed notes about process were kept in the researcher's journal.
Peer review	Peer review discussions were conducted with colleagues and supervisors about the process of study, the congruency of emerging findings with the raw data, and tentative interpretations.
Thick descriptions	Reports of the research should provide enough description to contextualize the study such that readers will be able to determine the extent to which their situation matches the research context. This thesis aims to provide that detailed description.

Table 2: Strategies to ensure the rigor in the conduct of the study

3.7.1 Limitations

Even when the aforementioned steps and processes identified within this thesis were conducted, possible methodological issues within a case study (Stoecker, 1991) and design-based research (Herrington, et. al., 2007) can occur. As such, the following limitations are identified and acknowledged:

1) Researcher Bias: As the researcher is working directly with the participants through the design, implantation of the TELE, as well as data collection, this inherently will have a level of bias (Merriman, 2002). Even though, the researcher bias was identified through past experiences, ontology, epistemology and trustworthiness of data, it should be stated that some level of bias cannot be avoided.

2) Generalization: Small sample sizes and qualitative methodologies allow for a deeper understanding of a research problem, but at the same time can limit the generalizability of the findings to any other context. This study was conducted with a small sample size within a small university faculty, with a specific focus of PE. Therefore, caution should be taken when applying conclusions outside this specific setting.

3) Time: Since DBR asks for iterative cycles of work, and this study is constrained to the time of the PhD, the application of 3 or more cycles was not possible and this could have limited the robustness that is housed under DBR.

4) Technical limitations: Even when we had a clear idea about what we needed for our online system and interactions with the students (e.g., prompts messages and video upload), the technical limitations of the online systems in our University made it impossible to implement. Because of this there were some limitations in what could be implemented in practice (e.g. the schedule tool). Even when we found alternative approaches (e.g., uploading videos via YouTube and office's word based schedule tool), we are not totally sure about how those affected the students who may have only been positive about them because of a social bias to please the researcher.

3.8 Summary

This chapter has provided a description of the research approach and method used to complete this study. Chapter 3 includes a brief introduction about the study and a description of the process and instruments utilized to collect data, the procedures of data analysis and way the researcher viewed the research process (i.e. ontology and epistemology). In addition, information was presented about the research design, theoretical framework and a description of the case context and participants, ethical consideration and the DBR process. Chapter 4 will provide the results for each of DBR's four phases, along with tables with the main themes found in each phase and conclusions for those themes.

Chapter Four: Results

4.1 Introduction

The purpose of this study was to understand how to design, develop and implement a Technology Enhanced Learning Environment (TELE) within a Physical Education Teacher Education program. The implementation of TELEs within higher education has been popular over the past two decades (Brown et al., 2013) because evidence supports TELEs as having the potential to enhance the educative process for both students and teachers by providing environments that have been shown to foster Self-Regulated learning (Aguilar & Byrnes, 2011; Bernacki et al., 2011; Zhao & Johnson, 2012; SRL). However, despite the benefits of TELEs, some issues in design and application must be addressed (Hartnett, 2010). Specifically, research focused on TELEs has been limited for teaching in physical education. That is why the purpose of this study was to examine the design, development and implementation of a Technology Enhanced Learning Environment within a Physical Education Teacher Education program. The results of this study have the potential to enhance our understanding of the benefits of TELEs in higher education and PETE. Furthermore, this study has the potential to contribute to the development and understanding of both SRL and Self-Determination Theory (SDT) as applied in an online setting. Participant data were collected in a four-phase design-based research process that included a variety of stakeholders such as professors, students and administrative staff within a PETE faculty. Data were collected using a variety of modes including questionnaires, interviews and focus groups.

This chapter will present the findings and results of this study. These will be presented in a chronological format as this will assist in providing the reader to develop a better understanding of the phases as they unfolded, with relevant literature included throughout. This chapter focuses only on the results that directly relate to self-determination, Self-Regulated learning and the faculty's organizational culture. A summary table of other emerging themes for each phase that were not directly related to the research questions can be found in the Appendix 15.

4.2 Phase One: Analysis of Practical Problems by the Researcher, Students and Practitioners in Collaboration

The purpose of Phase One was to collect and analyze information from professors, students and faculty staff about the potential for using a TELE in a subject from the bachelor in physical education. The information obtained within Phase One would be used for the development of the Moodle platform within Phase Two. Emergent themes from Phase One are presented below. It is important to note that the grounding of this study within SRL and SDT assisted in providing a research lens for the interpretation of the data and findings. The application of design-based research to this phase is shown in Figure 7.
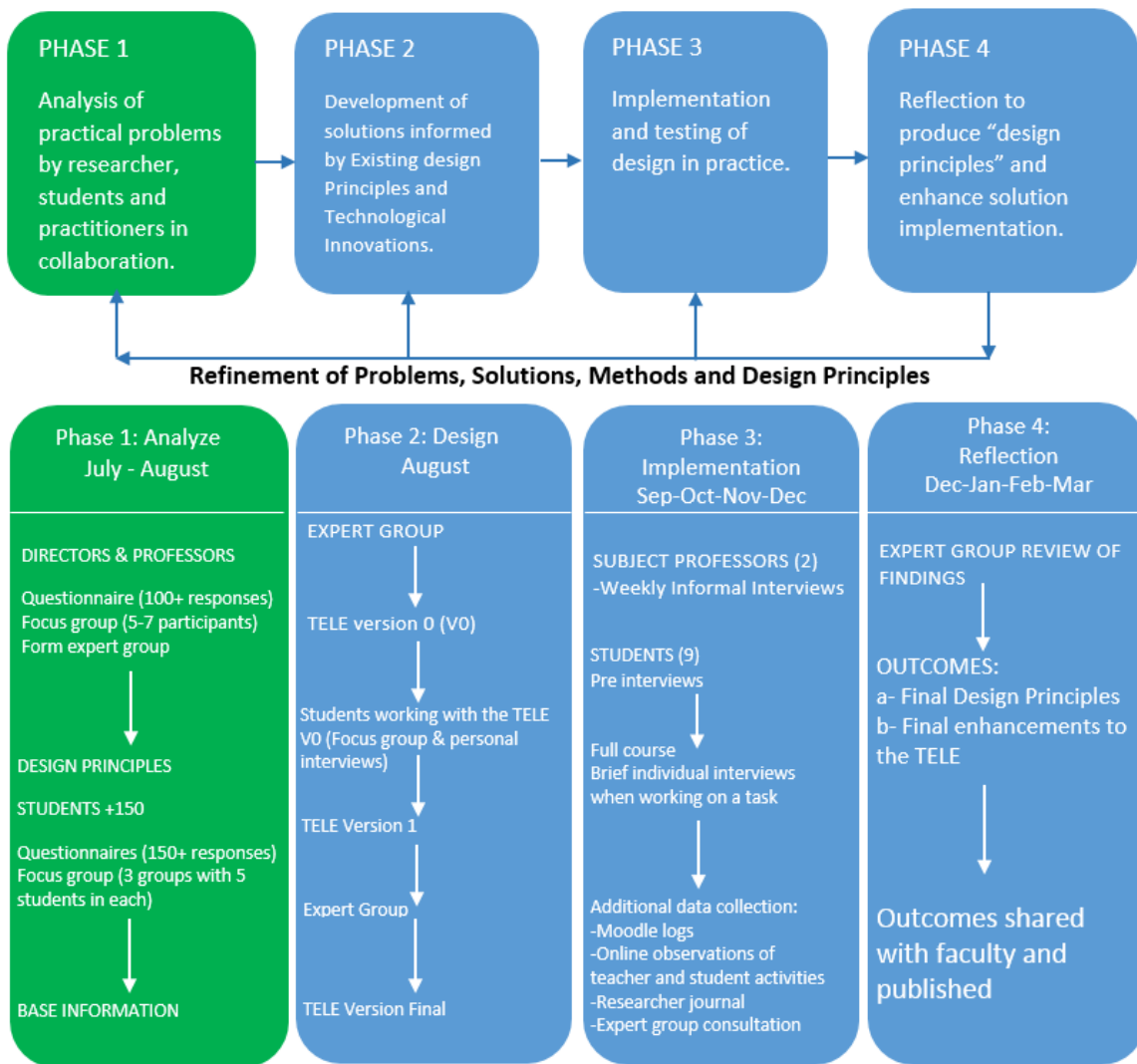
Figure 7: Application of Design-Based Research on Phase One

From this first phase, professors and students showed limited conceptual and applied knowledge of the elements of self-determination and Self-Regulated learning for use within a TELE and in PETE settings. Furthermore, professors and students identified key challenges for moving a PETE subject online, which were: (a) replacing the practical elements of PE; (b) the need for face-to-face interaction in PE; and (c) the difficulty in making appropriate and accurate evaluations in a TELE. The concerns were grounded in personal ideas and individual educational paradigms.

During focus groups and personal interviews students received further information about the principles and concepts of SDT, SRL and TELEs in a PETE subject. After that, they compare those concepts with activities, both during academic and non-academic tasks, where they already utilize those concepts as Self-Regulate for achieve a personal sporting's goal. After that comparisons, most of those aforementioned ideas of professors and students changed. However, even when professors, students and Physical Education pedagogical experts, from the expert group, agreed that although a TELE is theoretically feasible in PETE, some contextually specific concerns remain. The specific research context (AUCh) is an educational setting that on paper promotes independent learning and self-regulation while in practice the AUCh did not support professors with tools to design programs that support students' self-regulation and autonomous learning. As such, most subjects within the university-based programs were actually designed with tasks that conflict with the University's academic model (e.g., using traditional tests instead of authentic assessment activities). That situation reflects deep concerns about the organizational culture of the Faculty. These conflicting elements could raise questions about how the implementation of a TELE could work in this educative environment. As such, this study kept in mind not only how the design and implementation of a TELE could influence the students and relevant stakeholders, but also how the subsequent phases could change that beliefs and predispositions of professors, students and faculty staff when considering using a virtual class in a PETE program.

4.2.1 Limited Awareness of Autonomy and Self-Regulated learning

Questionnaire data revealed that professors and students had limited awareness of SRL and SD as illustrated by the following: "I haven't heard that word, self-regulation, before" and "I don't

understand self-regulation, how to encourage it with a student" (Professor A, Interview, Phase One). In addition, there was limited knowledge articulated about the concepts of autonomy and self-regulation: "We talk a lot about competencies, competencies-based education, but self-regulation, no" and "We are facing a lot of problems because we are not accustomed to giving autonomy to the students. We are in the process of adaptation to autonomy" (Professor B, Focus Group, Phase One).

Autonomy is one of the main characteristics that students and professors need to understand and work with within a TELE (Bernacki et al., 2011). Limited knowledge of self-regulation was suggested as 30% of the professors did not respond to the questionnaire item: "How do you support self-regulation in your classes?" Of the professors who did respond to this question, many indicated: "I do not know"; "Just a little"; "I believe that I do not promote it" and "Is not possible in my class". (Professors, Questionnaire, Phase One).

Focus groups and interviews with professors revealed their beliefs about students, namely that: "Students don't know how to self-regulate" (Professor C, Focus Group, Phase One) and "They [students] have problems to face in Self-regulation by themselves" (Professor D, Interview, Phase One). However, since professors did not have data about Self-regulation among students and many do not possess knowledge of what Self-regulation is. In essence, Self-regulation is making a decision about whether students did or did not possess internal control over their actions and behaviours toward the educational task(s). Furthermore, some students are actually self-regulating in school, shown in this statement: "Right now I am truly non-conforming with the classes, especially with getting the information. Right now I am taking home books from the library and reading by myself" (Student A, Interview, Phase One).

4.2.2 Using Technologies in a PETE Subject

Data collected showed that the professors were not resistant to the use of technology in a PETE program. Most (81%, n=53) believed that technologies such as the Internet could be useful in a movement class just as much as in a traditional class. Most, 60% (n=39), indicated that they were willing to use online technology if they were provided with more technological and pedagogical support. However, 76% (n=46) of professors (See Appendix 16, item 14) and 55% (n=36) (See Appendix 17, item 10) of students stated that technologies in a PETE program should be used as

an additional support for the educative process and not as a complete replacement for taking a class (i.e., not 100% online).

Professors had strong personals beliefs that conflicted with technology use in Physical Education. For example, 80% (n=52) did not believe that the practical part of a PETE subject could be successfully taught in a virtual class. More importantly, 34 of the 65 professors (52%) in Phase One reported never using online classes or classes supported by internet within their teaching. A majority of professors (n=45, 70%) reported never using the official platform for University classes (i.e. Moodle) within their classes. This descriptive data means that 70% of the professors in this sample had not used the university supported online platform, even as a support element within their teaching. Despite this lack of knowledge, some professors were interested in using technology in their classes. For example: "I want to create apps for my subject, but this is a problem because of my ignorance about the University's process to create and incorporate those apps" (Expert #5, Interview, Phase One).

When asking for the professors' thoughts about student usage of online technologies, some professors believed that it is not feasible at that point of the Bachelor degree (second semester) because "students come to the University with a firm high school style [of learning] with a different way to receive the classes, and by second semester there has not been enough time to take that idea away and they don't have discipline" (Professor A, Interview, Phase One).

That belief was supported by students' responses with 65% (n=42) reporting they had been using the university's Moodle system, but 68% (n=44) never wanting to take a subject online or enroll in one that is supported by online technologies. Furthermore, 85% of students (n=55) did not believe that an online PETE program could ensure the practical part of a PETE was successfully completed. While the majority of students indicated limited engagement and involvement when working within an online setting, a small proportion did illustrate some level of interest and desire with 37% (n=24) of students showing an interest for at least learning more about using a TELE and 50% (n=33) of the students from the questionnaire considering using a TELE.

On the other hand, four professors from Phase One believed that students are so into technology and the Internet that it is just a matter of using it for education purposes: "Students use Facebook and social networks… let's use it for educational purpose" (Professor E, Focus Group, Phase One). Prennsky (2006) supports the trend of online educative technologies indicating that using technology, even in a limited capacity, is a logical step for young people (i.e. digital natives). This trend may not be practical as 63% (n=41) of the students from the second semester cohort in this study indicated they would choose not to go online if they had the choice. That is similar to what literature states about students not taking online courses or preferring face-to-face instruction at least for practical activities (Shi, Du, Jiang, Bin Saab, 2011; Kemp, Grieve, 2014). Students in this study did not feel ready to leave their traditional learning style to learn away from face-to-face classes using online resources, for example: "Maybe we need to have the other students around" and "I can't imagine that, truly, with videos? Watching people?" (Student A, Interview, Phase One).

Students in this study also believed that social networks are a distraction and must not be used for academic purposes: "On Facebook we are looking at postings, status updates or images, and that will be a distraction" (Student B, Focus group, Phase One) and "Social networks are not stable and the information can be a negative for other people" (Student C, Focus Group, Phase One). These comments align with Kennedy, Judd, Churchward, Gray and Krause (2008) who suggest that "the transfer from an entertainment technology to a learning technology is neither automatic nor guaranteed" (p. 119). We cannot assume that students who use technologies for leisure will use it in educational environments and vice versa (Koutropolos, 2011; Costaa, Alvelosb and Teixeirac, 2013). Finally, Bennett, Maton and Kervin (2008) suggest the need for "considered rigorous investigation that includes the perspectives of young people and their teachers and that genuinely seeks to understand the situation before proclaiming the need for widespread change" (p. 14). These comments from the literature align with the findings from Phase One of this study.

4.2.3 Self-Efficacy and Motivation

Self-efficacy, a condition to self-regulate (Zimmerman, 1990), is important because it helps to predict not just performance; but motivation. Both, professors and students felt themselves to be

efficacious in Phase One about using a TELE. That is congruent with Ornelas et al. (2012) showing that this faculty's students perceive themselves as high in self-efficacy for indicators of academic behavior (e.g., communication, attention and excellence). Basically, most professors (86%) and at least half of the students (50%) from the questionnaire considered the real possibility of using a TELE, even though their initial thoughts did not consider a TELE in a PETE as 100% effective. This could mean that they are confident in themselves, but not necessarily in the TELE.

Zimmerman (2000) explained that self-efficacy is "a performance-based measure of perceived capability" (p. 1). Upon completion of the focus group interviews focused on self-regulation and the use of TELEs, students made it clear (with examples) that they actually self-regulate, but not in academic environments. For example, participants made the following interview statements about self-regulation outside the school in sport settings:

> Participant: I did it in tennis; in serving I made a three-month plan to achieve a successful first serve.
> Researcher: Did you follow that plan? Did you achieve that goal?
> Participant: Yes" (Student C, Focus Group, Phase One).

In addition, "In baseball I made a plan to achieve two goals: one, speed and two, accuracy on my pitches" (Student B, Focus Group, Phase One).

These statements contrast with their accounts of self-regulation in school: "Because schools don't motivate us to self-regulate, we can't self-regulate because the school gives all by default times and dates" and "We are not interested except in some subjects… and, in those subjects what motivates you? Fun!" (Student D, Focus Group, Phase One). Professors understood and agreed these comments: "The goal must be that students bring their self-regulation processes from outside into the school" (Professor C, Interview, Phase One). These findings are strongly associated with Loomies (2000) who stated that today's classrooms are not preparing students with Self-Regulated learning skills, especially within online educational settings.

Motivation is multi-factorial in influencing people's choices (Pintrich & De Groot, 1990; Seyler et al., 1998) and can be defined as the "process whereby goal-directed activity is instigated and

sustained" (Schunk, Pintrich, Meece, 2008, p. 5). Motivation is very important for self-regulation because without sufficient motivation, SRL can be neither initiated nor sustained (Hall & Goetz, 2013). Students' motivation to self-regulate is essential for them to be successful in online learning, however the lack of self-regulation was raised as a possible issue. The following quotes highlight student concerns: "Nobody is going to force to you [online] like in the classroom"; "We would not have the professor's pressure"; "The Internet is a distraction" and "[Being in the classroom] forces you to interact and to pay more attention" (Students, Questionnaire, Phase One). These concerns are reflected in the questionnaire response from 91% of students (n=59) that learning is easier in the classroom.

While motivation and self-regulation can be associated with educational value, some students expressed concerns about the "possibility of supplanting identities for cheating" (Students, questionnaire, Phase One). That is, students were concerned that there could be cheating in an online course because participants could not be easily identified (i.e., someone else could do the work for them etc.). This coincides with some research (Chapman & Lindner, 2016) who found that corruption (cheating) can be more common because many of the key activities of higher education, such as teaching and administrative tasks (e.g., tutoring and grading practices) when done online "may be largely invisible to the instructional staff or students" (p. 248).

Some of the professors (n=20, 30%) indicated that they were not sure how to support student autonomy and self-regulation. For example, "We are not working on student [self-regulation] because we are still as professors so authoritarian" (Professor E, Focus Group, Phase One). Some professors expressed the need for support: "I will need training about the platform and research about it to redesign our program to see how the students work and force them to work a little more" (Faculty Staff A, Interview, Phase One). While it is positive that professors expressed their need for support to develop students' self-regulation, the process of achieving such outcomes is complicated (e.g., Cleary & Zimmerman, 2004). Making the changes needed to teaching are likely to be more challenging than the professors realize.

The interplay between self-regulation and motivation was a theme reiterated by the Expert Group which was also established in Phase One. The group acknowledged that the underlying reasons

why a student engages in a degree are varied (e.g., enjoyment, employment etc.), however all must self-regulate their learning at some level. This is a primary reason why the academic model at the university at which this research was conducted is grounded in self-regulation and expects the student to be motivated. An example of the interplay between self-regulation and motivation was illustrated through discussion about a student who fails. If a student does not achieve educational success, this could be attributed to their lack of self-regulation and motivation influenced by elements such as a lack of control in their education. This was explained by one of the participants: "When the students feel things are imposed, some respond with compromise, other do not" (Expert Group Participant, Personal Interview). This concern is consistent with other research (Orange, 1999; Abrami et al., 2011) that shows when the academic environment does not motivate the use of self-regulatory skills there can be a negative influence on the educational progress of students.

4.2.4 Interest in Online Learning

The general response of the professors and students participating in Phase One to the idea of taking a subject online was initially positive. Professors' interest in working in a new online environment was high; with only 6% (n=4) of the professors saying "no" to the possibility of teaching a completely online subject. The professors considered an online environment as beneficial because they could "save time"; take advantage of "more options to me to deliver my class" and "it is the future…online subjects". While interest in and motivation for online teaching was high, there was a discrepancy between the type of class professors were prepared to teach online. For instance, more theoretical classes (e.g. sport management) were thought to be more feasible to be taken online (47%) when compared with a practical subject (e.g. gymnastics) (2%). Also, when asked on the questionnaire about their own subjects being taken online, 83% of professors and 47% of students (n=31) considered a transition to online education to be feasible when the class was tagged as theoretical.

However, this faculty does not provide a readily available labeling procedure and system to distinguish between a theoretical and/or practical subject. As an example of the variance in labeling the content of subjects, three different professors when completing the Phase One questionnaire provided very different responses when being asked to provide the percentage of

102

time allocated to theory and practical within the same subject. Please see Figure 8 for a representation of their different responses.
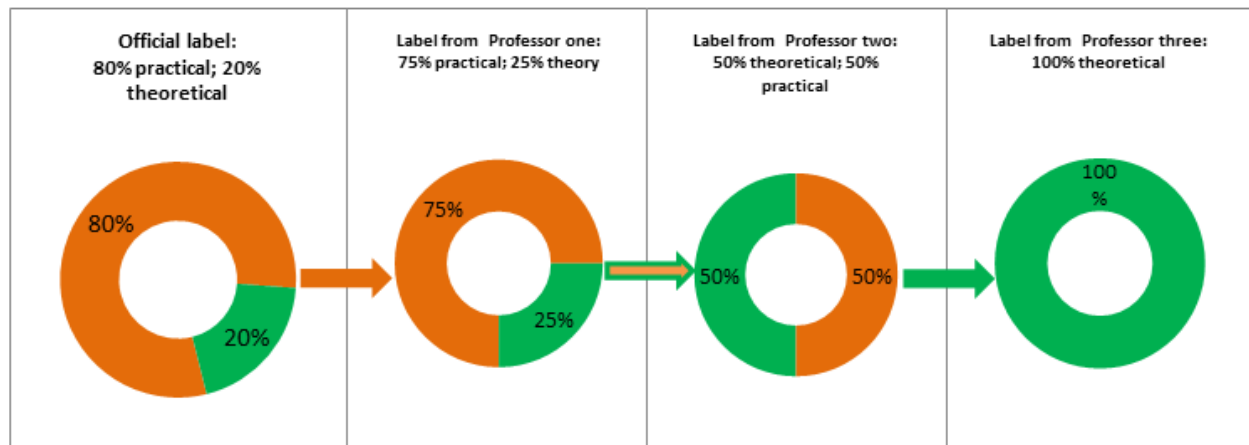
Figure 8: Differences in label by three different professors for the same subject (Technology and Management of Information)

This variance could be an important aspect because if the single process of labeling a subject, as theoretical or practical, could affect a professor's interest in teaching a subject online. This suggests that there needs to be more discussion and possibly a process developed to label subjects.

4.2.5 Influence of the Faculty's Organizational Culture

Today's educational institutions are driven by organizational culture (OC) (Somprach, et al., 2015) and this is a complex construct. Hofstede, Neuijen, Ohayv and Sanders (1990) identified a six dimensional model of OC defined as: perceived common practices "only completely experienced by insiders" (p. 313). Those six dimensions give a sense of how different organizations can vary in the following ways:

1. Process-oriented versus Results-oriented: Identifies routines that may be bureaucratic instead of achieving the organization's outcomes

2. Employee-oriented versus Job-oriented: Assesses the extent to which the job is driving the organization versus supporting employees' well-being.

3. Parochial versus Professional: Characterizes the degree to which employees' identity comes from the organization or from their type of job.

4. Open System versus Closed System: Focuses on internal and external communications and how easy new personnel are accepted in the organization.

5. Loose Control versus Tight Control: Rates how strict the organization's internal structure and rules (e.g., dress codes) are.

6. Normative versus Pragmatic: Reflects how the organization deals with their environment whether the context is rigid and normative (e.g. ethics and honesty matters most) or pragmatic and flexible (e.g. results are more important).

The professors in this study agreed that for the effective implementation of a TELE or any other educative system "we must be aware of the faculty's organizational culture" (Professor E, Focus Group, Phase One). Organizational culture impacts the educational vision and direction within all organizations. Within this study, the FPCS has been guided by the university vision yet have not, to date, progressed toward online education. A plausible reason for the limited progress toward online education is captured in the following statement: "All of that will impact the development of your project…using a TELE…because the people directing the Faculty do not know about [online learning]; neither are they interested in developing it (Expert #4, Interview, Phase One).

Findings from questionnaires, focus groups and Personal Interviews illustrate the role of organizational culture in the way a university can facilitate toward online education. The idea of using online teaching and learning is something that professors "talked about every day in the faculty" (Professor F, personal communication, April 2016). That is important because the professors believed that online education, as a supporting tool, could help this Faculty. That is reflected in the questionnaire data where 55% (n=36) considered that PE supported by the Internet could be a good implementation. However, PE teaching paradigms, especially with this Faculty's staff, seem to be an impediment: "There is no better way than students being here, in person [face-to face] for building their learning" (Faculty's Academic Chairman, Interview, Phase One). Most of the students, 86% (n=56), indicated that they did not believe that a PE teacher who had completed an online bachelor could be as prepared as one who had studied in a traditional classroom. Furthermore, 88% (n=57) of the students believed that a graduate from an online bachelor program would not be as employable: "You will not find a job because you do not have the practical part" (Student, Questionnaire, Phase One). Similar beliefs were also

reported in research about how student worry about not actual but distant threats, such as problems for future employment (Serna, Rojas and Linares, 2011) which could be labeled as anxiety (Zinbarg, Craske & Barlow, 2006).

It is interesting to note that this concern associated with future jobs in PE was also evident later within the Phase Four interviews amongst people in charge of assigning jobs in the Physical Education area (i.e., the Head of Linking with employment sectors, such as the Chihuahua State Secretariat of Education, Culture and Sports). Comments made revealed negatives answers to the question "Is the Physical Education's area ready for graduates from an online bachelor?": "I do not think so. I believe that we are not ready yet…especially because of the particularity of our area…with so much practice" (Expert #5, Interview, Phase One). Stressing particularities (i.e. paradigms) of "our area" (i.e. context) as a determining factor for utilizing online education or granting jobs to graduates coming from online education has been found in research for in real contexts (e.g., Shunk, 2005). It is not uncommon to use employment as a subjective factor to evaluate the use of technology (i.e., online education) (Price & Kirkwood, 2014). As such, some ideas or paradigms about online education, specific to this context, must be researched.

Most professors, students and staff believed that using a TELE in a PETE was not a good idea, and almost all of them would not want to teach/learn a subject in a virtual/online environment. However, since the study population had little information about using a TELE in a PETE program, and that lack of knowledge could be facilitating those paradigms to keep influencing their assumptions (e.g., Price & Kirkwood, 2014) In addition, Guba and Lincoln (1994) argued that "a paradigm may be viewed as a set of basic beliefs that must be accepted" and "there is no way to establish their ultimate truthfulness" (p. 107). That concept is reflected in comments from administrative and academic staff suggesting that their opinions about the impossibility of online education in PETE is actually based on paradigms: "Most of the virtual bachelors are from theoretical areas like: management, social sciences and philosophy [not about PE]. My position is based on paradigms that are already well established" (Faculty Staff A, Interview, Phase One). That comment is congruent with some previous research (Means et al., 2010; Casanova et al., 2011) affirming that using a TELE could mean a change in the instructional approach and may affect the teaching-learning process. For change in paradigm to occur, Guba and Lincoln (1994)

suggest that benefits of a new paradigm must be illustrated in order for the old one to be somehow modified.

This change in paradigm and perception could be achieved as stated by one participant by: "using a TELE in a PETE program, however I don't believe that could be as effective as the face-to-face one. We must keep in mind that we are in the health area, but also the Humanities area is present because we live with individuals, we attend persons, the professor-student relationship, etc." (Faculty Staff A, Interview, Phase One). On the contrary, students had a different opinion, for example: "Face to face interaction is no longer a necessity… it is better to receive real time feedback even if it is via video, rather than weekly in the classroom" (Student E, Focus Group, Phase One). These comments suggest that students might be more receptive to changes in PE teaching and learning paradigms than their professors.

4.2.6 Resistance to Change and Change Management

Professors and students present different points of view about the possibilities of implementing an innovation as using technology on a PETE, some negatives as "I don't believe that using a TELE in a PETE could be as effective as face-to-face (Faculty Staff A, Interview, Phase One); other positives as "We need to modify the goals and programs of the subjects to work in a TELE" and "change traditional ways of acting" (Professor C, Focus Group, Phase One). Students present mostly positives opinions, for example: "Face to face interaction is no longer a necessity… it is better to receive real time feedback even if it is via video, rather than weekly in the classroom" (Student E, Focus Group, Phase One). Both are responding to what researchers called organizational change: the transformation of components o process within any organization (Grama & Todericiu, 2017) on this case using an innovation. That is important because professors and student's response to those implementations depends, on part, on their perception about if that possible change could be effective or not (Mdletye, Coetzee & Ukpere, 2014) and their possible resistance to change. For that, Kiefer (2005) stated that the success or failure of any changing process must be understand based on the individuals' resistance to change; defined by Grama and Todericiu (2017) as "any opposition to the alteration of a certain situation" (p. 48) and mainly influenced by insecurity; even when is stated from a multi-dimensional nature (Smollan, 2011). That resistance to change cannot be modified overnight

(Delaney & D'Agostino, 2015) and can be present in any area including using new technology (Gonçalves & da Silva, 2012). Professors and students' comments suggest that students might be more receptive to changes in PE teaching and learning paradigms than their professors.

The other important factor to the success or failure of that innovation's application is how the organization manage those individuals' response to changes: change management (CM). CM is the "process of planning and coordinating the implementation of all changes through individuals, teams, and organizations" (Malek & Yazdanifard. 2012; p. 1). However, change management is not an easy task because organizations are always in movement, and are complexes and the factors that affect change such as fear of the unknown and lack of confidence, are not just different form organization to organization, but even into a same organization are in continuous change (Choi, 2017). Failing to understand that process of organizational change is the cause why 70% of change initiatives fail (Beer & Nohria, 2000).

4.2.7 Program Design and Alignment with University Academic Model

An important consideration is if the design and application of the Faculty's programs is following the University's Academic Model, aimed to support students' skills such self-regulation and self-determination, and if not, to consider the implications. The Autonomous University of Chihuahua is working within an academic model aiming to develop students' skills, knowledge and attitudes (i.e. a set of competencies) to fit appropriately into the work structure and solve social problems. This model was created to develop self-regulated students, as stated in the University's own academic guidelines where the student is considered a self-advocate for their own learning and the professor is responsible for producing learning environments where the students regulate their learning (UACH, 1998). However, professors within this study recognized their programs are not specifically designed to develop self-regulation or autonomy in students, saying, for example: "The programs are made in a collegiate way only to fulfill the requirements; content is used, but the strategies change" and "sometimes it seems like we use self-regulation in our classes, but not in a conscious way" (Professor G, Interview, Phase One). These statements illustrate that if self-regulation is facilitated this occurs by chance and not through intentional pedagogies. As one professor stated: "We are not ready as professors to teach/work with self-

regulation… the academic model of the university should be preparing us to teach students to self-regulate, but is not" (Professor A, Interview, Phase One).

Comments showed that the professors identified an awareness of the need to focus on developing self-regulation in students and that this could be more a professor's personal issue. For example: "We must be intellectually honest to a big scale, to bring a real product, not just pretending to be the perfect teachers; but in the practice we are just the opposite" (Professor E, Focus Group Phase One). The same can occur within other subject areas that teach in online settings:

> In the English diploma, you have to get on the platform and make certain assessments,
> apart from class, but also they set the date the work must be finished … so it's the same
> as in class and they [professors] tell you what you have to do by such a date (Professor D,
> Interview, Phase One).

Another professor described how AUCh's academic model is translated from theory to practice: "For me, the AUCh competencies' model is very theoretical. The [university officials] never tell you exactly how to develop the AUCh competencies in the students or what strategy to use to create a more autonomous student" (Professor A, Interview, Phase One). Another said: "I will need training about the platform and research about it to redesign our program, to see how the student work and *force* him to work a little more" (Faculty Staff A, Interview, Phase One). That is seen especially for professors with classes in the last semesters, when the students have already passed most of their subjects working with the University's academic model:

> As a last semester's professor, where the students come after working with the
> University's academic model in their previous studies, and should have all the
> competencies to self-regulate, I believe that is not working. Students still wait for the
> professor to tell them what to do; and the exceptions to that are not because of the
> academic model; but the student's own personality. (Expert #5, Interview, Phase One)

It is feasible to think that professors consider that this Faculty is not properly following the University's academic model on, at least, two aspects: (1) the design of the Faculty's subjects, with most programs designed to fulfill a basic requirement and not strongly grounded in the AUCh competencies based model (e.g. don't facilitate students' self-determination and self-

regulation) and (2) the practical application of the model, with professors considering they have not been receiving specific training to develop student's competences (e.g., self-regulation). Implications from that could be a lack of student's competences (e.g., self-regulation skills) not just in a future online environment, but now within the traditional classroom.

4.2.8 Factors Related to Self-Determination and Self-Regulation

This section summarizes data collected in Phase One that relates to the concepts of competence, autonomy and relatedness from self-determination. Each of these offered insights into considerations that needed to be taken into the design phase (Phase Two).

a) *Competence* is the "sense of effective interaction with the environment" (Niemiec & Ryan, 2009, p. 3). From the questionnaire at least 50% of professors (n=32) expressed concern about teaching their subject totally online. Comments from interviews about a "lack of experience" with the online system, as well as "not knowing the features of that system" are indicative of a lack of competence for developing and implementing a TELE. Expressing concerns or anxiety about their own competence to appropriately implement a TELE could illustrate a strong association with limited support for the psychological need of competence as espoused by SDT.

AUCh competencies is also aligned with assisting PE professors toward developing and implementing relevant educational experiences that meet the changing needs of their students. Comments suggested that the goal of learning was not clear to professors. Some expressed a focus on *sport* and not *PE* was guiding their subjects: "in the bi-annual academy we make changes to the programs because *sport* is always changing..." (Faculty Staff A, Interview, Phase One). This suggests that professors could feel a lack of academic competence since subject goals are important not just because they help to select curricular content, but also provide the groundwork for facilitating structure (i.e. guiding learning) (e.g., Deci & Ryan, 2000). Furthermore, a professor who is competent will be able to allow for the choice of the most effective learning method (Thomas, Kern, Hughes and Chen, 2016) by having a clear direction (i.e., subject goal) and perceiving a level of control over the student learning (i.e. autonomy support) (Deci & Ryan, 2000).

Finally, the University's capacity to bringing online education to the masses could be an issue because students and professors felt that the University system was not efficient at this point in time. For instance, the online system was described by one professor as: "complex to upload videos and load apps [in the school]… and the Internet is slow" (Professor E, Focus Group, Phase One). Another said: "we do not have virtual education; we [the university] are behind about it" (Professor B, Focus Group, Phase One). The findings suggest that the University's system does not work well as supported by the following common experience, described as: "When trying to use the University's Moodle, most of the time I get the security message prompt" (Student E, Focus Group, Phase One). See Figure 9 for an example security prompt.

Your connection is not private

Attackers might be trying to steal your information from **decad.ev.uach.mx** (for example, passwords, messages, or credit cards). NET::ERR_CERT_AUTHORITY_INVALID

☐ Automatically report details of possible security incidents to Google. Privacy policy

HIDE ADVANCED   Back to safety

This server could not prove that it is **decad.ev.uach.mx**; its security certificate is not trusted by your computer's operating system. This may be caused by a misconfiguration or an attacker intercepting your connection.

Proceed to decad.ev.uach.mx (unsafe)

Figure 9: Security message prompt

Overall, if feelings of academic competence in the professors are not supported, their ability to support student academic competence may be undermined.

b) *Autonomy* is "behavior as volitional and reflectively self-endorsed" (Niemiec and Ryan, 2009, p. 135) and is related to the following observations. Professors believed that they were not

supporting autonomy: "we are not giving to the students the real possibility of choice" (Professor E, Focus Group, Phase One). Students reinforced this concept whereby "the school is not giving us enough freedom to act" (Student A, Interview, Phase One). This suggested that there was still an ingrained sense of control facilitated by the professors, also demonstrated in these comments: "Students still need to be under the professors' guidance" and "It is easier to handle the students like that, with the professor giving the dates of work and everything" (Faculty Staff A, Interview, Phase One).

c) *Relatedness* is "associated with a student feeling that the teacher genuinely likes, respects, and values him or her" (Niemiec and Ryan, 2009, p. 139). Professors and students believed that online education could take away important aspects of interaction: "We work with people… so taking PE online will take away that human touch… we will create cold professors" (Professor A, Interview, Phase One). Being able to support a sense of social connection is critical in facilitating the self-determination of learning (Black & Deci, 2000). The statements and feelings expressed by some participants highlight the need to support professors and students' relatedness (e.g. listening to what students say and feel). For some professors the idea of online education, goes against their *personal view of education* and humanism: "PE is an area about working with people, how can you virtualize that?" and "I chose Physical Education because we directly work with people, that humanistic part is different from other [fields], using a TELE can take that humanism away" (Professor A, Interview, Phase One).

In summary, the movement from a traditional face-to-face subject to an online experience can be a complex task for both professors and students. This finding is consistent with Puzziferro and Shelton (2008) who stated "developing an online learning/teaching system is a complex process" and support the focus of the Design Based Methodology to solve complex real world problems (Reeves et al., 2004). Phase One sought to understand how professors and students would respond to a TELE for PETE so that an appropriate design could be developed and tested in Phase Two. The next section describes how the researcher and the participants took on this challenge in light of what was learned in this first phase.

4.3 Phase Two: Development of Solutions Informed by Existing Design Principles and Technological Innovations

This phase was about the development and evaluation of the online practical subject (Gymnastics 2 TELE) in the institutional Moodle system. Following Phase One's focus groups, all professors, including some from the expert group, were asked to think about how they were going to use Self-Regulated learning and self-determination concepts in both academic and non-academic settings. As part of this process, professors particularly focused on how those processes could be transferred from students' non-academic settings into to educational environments.

The development and evaluation process was supported by focus groups, during which students learned about the Self-Regulated learning and self-determination processes and then gave feedback on successive versions of the TELE. Students began with a draft version (Version 0), and suggested refinements and/or changes to obtain the first workable version (Version 1). The expert group then used those student suggestions to make the final adjustments to develop the final version (VF) implemented in the Phase Three. The application of design-based research to this phase is shown in Figure 10.
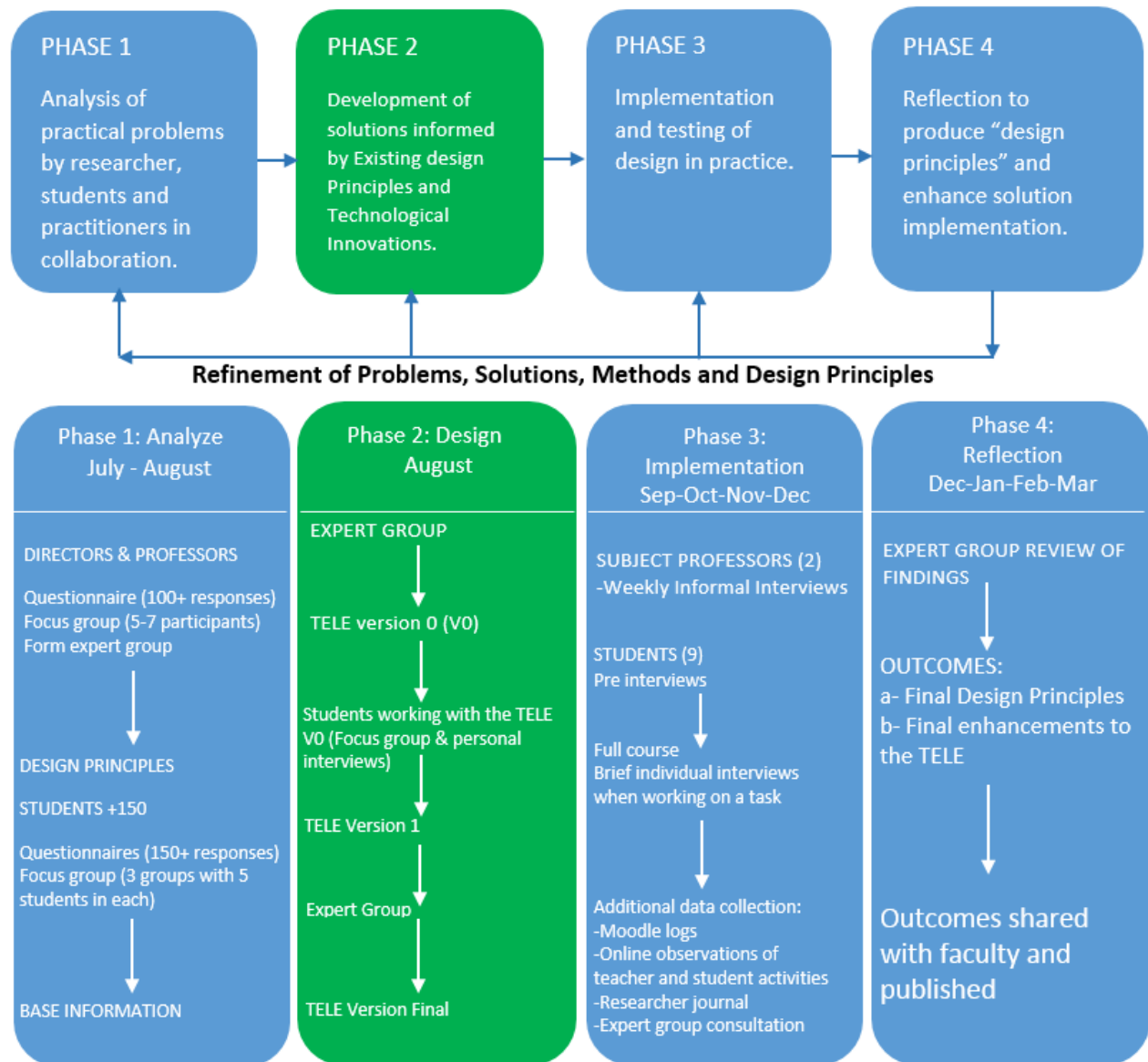
Figure 10: Application of Design-Based Research on Phase Two

This chapter presents results directly related to self-determination, Self-Regulated learning and the faculty's organizational culture influence. Over the course of Phase Two many other issues arose that informed the design but were not closely related to the research focus. A full list of these emerging themes from Phase Two has been included in Appendix 15 for the reader's interest.

4.3.1 Overview of the Design and Development Stages of the TELE

In order to develop the Moodle platform, for 'Gymnastics 2', the subject's original design was changed by the professor in charge of teaching the class in at least four ways:

(1) The subject goals were modified to achieve a new objective: Students must learn how to teach the movement and not to just learn how to do the movement.

(2) Tasks and assessments: The original program used separate units to each part of class. Now instead of a full unit, specific tasks were utilized (e.g., students choosing how to send each task), each task could be used as an assessment (e.g., fill and send the schedule tool) and each task must be progressive in helping to achieve the next task.

(3) Technological issues: Allowing students to self-regulate in the online environment would require additional technological assistance through strategies such as sending reminders during the semester and showing instructional videos to students. In addition, changes were required that allowed students to upload videos to the subject's platform.

(4) The self-regulation process was supported with the inclusion of a schedule tool that asked students to decide times and ways to do their tasks.

New online resources were also created as part of this process. Each new task (e.g., decompose a movement into its parts) needed video tutorials showing what to do and how to use the technology within the TELE. In addition, assessments (e.g., showing a movement to another person) needed specific rubrics (i.e., criteria for the evaluation) (See Appendix 18) so each student could be able to have a guide not just about the work to do but the aspects to be evaluated and how. In the online subject students were able to access to documents, didactical videos, and tools to help them to work through the tasks (e.g., a schedule tool and personal chats). Students used that platform to first learn, via videos and text, about pedagogical ways to teach a gymnastic movement; and later to send documents and video links for the required tasks. Finally, students were able to use instant communication tools (e.g., Whatsapp) to receive immediate feedback and to present any task live instead of sending a video.

A Moodle's draft to support the TELE (see Figure11) was presented to the University's Coordination of Continuing Education, Open and Distance (CECAD) experts to explain each

task; relevant educational tools and changes required to the trial version, based on the recommendations from Phase One, as well as to align with the University's requirements.

Figure 11: Moodle's draft to support the TELE

Moodle Version 0 was developed based on the recommendations from CECAD experts. This version was like the initial trial in terms of the learning activities but included changes in the presentation of information and further interactions with the students were implemented (e.g., forums). As a result of Phase One interviews and consultation with the CEDAD experts, the revised version was expanded to include forums and individual folders for each of the learning activities (see Figure 12). Those recommendations followed the Design Principles (DP) utilized within the AUCh academic supporting tools (e.g. Moodle). In addition, those DPs cover not just the AUCh's academic recommendations but SDT and SRL topics such as competence, autonomy and supporting students when they utilize the forums for peer help, support from the professor (Self-regulation), and/or expressed their ideas or interest about a specific topic (Relatedness-SDT).

Figure 12: Forums and folders on the Moodle platform version 0

The implementation of the folders provided a more organized experience for the user compared with the first draft where students were required to read either a Word document or a plain text screen. The main folder included the welcome and a description about the subject in general (Figure 13) (e.g., '*programa del curso*', in the draft version).

Figure 13: Welcome and description of the online subject

A separate folder was created for each subject task (see Tabs in Figure 12). Figure 14 shows the separate activity page that students could navigate to using the tabs.

Figure 14: Subject Task 1

As for the overall course design, there was a modification to the linear nature, with a separate sequence of activities (see Figure 9) to address the instructional design and didactical sequence recommendations from the CECAD experts, to facilitate information processing and reading, and allowing a student to quickly retrieve information.

Review of the Moodle platform version 0

After reviewing Version 0, the teaching professor and I identified that even when the students had a visual representation of the sequence of tasks (see Figure 11) it was not the idea we had for the schedule. Our idea of a schedule was more about allowing students to know how to develop a plan to successfully achieve each task, and be able to monitor, control and reflect on that plan (e.g., self-regulation process).

The professor and I sent messages to CECAD staff to discuss a 'schedule tool' but did not receive a reply. A plausible reason for the lack of reply by the CEDAD was that it was the beginning of the semester and the staff was extremely busy. We knew that a 'schedule tool' could be created as an extra for Moodle, in any design software, such as Flash. However, we needed to use the official tools and be at the same developmental stage as any other Moodle subject utilized by all the other professors. So, we decided to add the 'schedule' (See Appendix 14) to the platform as a Word document (Figure 15).
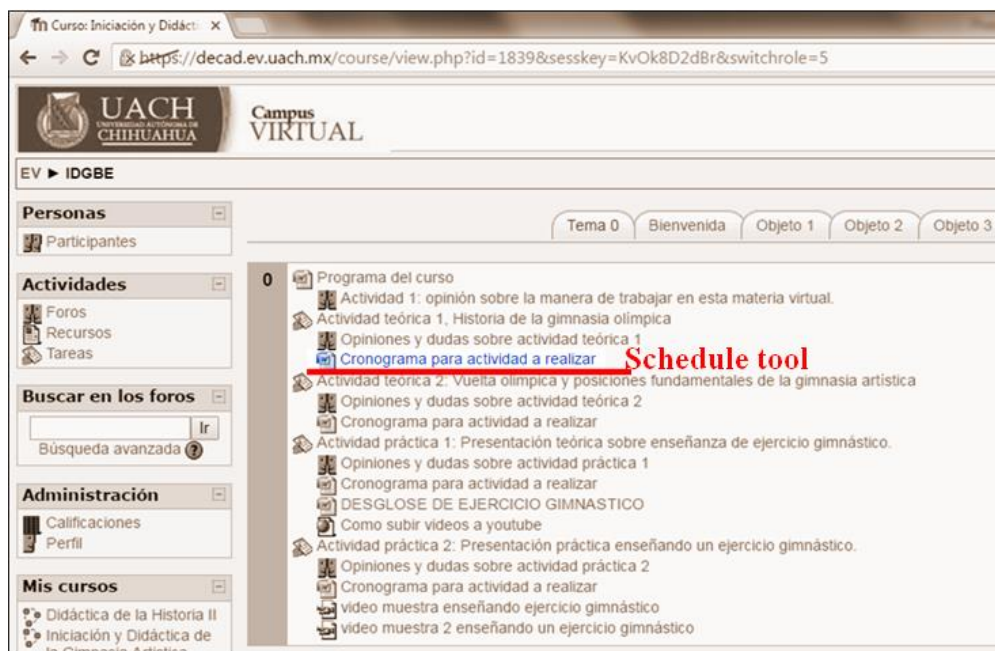
Figure 15: Schedule tool

At this point in the study, the subject professor and I decided that the Moodle platform Version 0 was ready to be disseminated to the students for the formative evaluation and possibly changes and suggestions.

4.3.2 Results from Phase Two Evaluations

The focus groups started by giving students information about the Self-Regulated learning and self-determination processes used within the TELE. Students were facilitated to check each task and component, including the schedule and videos. During the entire review process students were allowed to ask questions and provide suggestions to improve the educational value of the TELE. Finally, the professors expressed their ideas about what they expected the students to do in the TELE, and together with students experienced working with the TELE. Feedback collected from the entire consultation process was used to create the Final Version of the Moodle platform. The results of the evaluation within this phase are presented below, including the students' experiences working with the TELE, and the professors' comments.

Students' Experiences Working with the TELE

A main aim of Phase Two was to allow students to judge aspects of the TELE's design. From professors' and students' opinions in Phase One, we had a consensus that current educational environments were not strongly supportive of autonomous or self-regulated educative practices. It was expected that the traditional lack of autonomy and self-regulation could have an impact on how students engaged in the design of a TELE with its enhanced options for student choice and the opportunity to suggest changes to the educative program. In Phase Two the students had their first experience with the TELE. Mostly, students expressed few doubts about the TELE itself or the possibility of working on it. Most students' concerns were related to the academic environment and interactions with the professors and basically focused on how to evaluate and assign grades for a practical task in the online platform and not so much the TELE itself. Some themes arose as outcomes from students' interviews, during and/or after their use of the Moodle platform Version 0. Following is a description of each theme.

Motivation about Using the TELE

Similar to Phase One, motivation arose as a factor in Phase Two, where students stated that they do not self-regulate in academic environments because they were not motivated enough. The school gave them all the tasks to do, with the professor in charge and guiding the process of learning. This was reflected in Phase Two through comments like: "in the classroom the professor is always asking for the tasks" (Student F, Focus Group, Phase Two). The students stated that a TELE could change that because this education processes could give the student the real possibility of choice and being in charge of their own educative process: "For me is the same [choosing or not] but still I prefer to be able to choose some things in the class" (Student G, Focus Group, Phase Two). This is important because students stated how changes in the motivation dynamics (e.g., students choosing instead of professor) via the TELE could motivate them to self-regulate; and literature has suggested that the self-regulation process is influenced by the context (Cleary & Zimmerman, 2004; Pintrich, 1995). This could mean that apparently for those students, motivation to use a TELE could come not just from their own personal factors (e.g., I feel able to do it), but could be really influenced by the TELE itself, as supported by Gedera, Williams & Wright, 2015).

While using the TELE for the first time, students considered participation in the design and implementation of the TELE as a positive motivational influence. For example, "Great, because they [professors] never asked for your opinion. It is great that they ask about, how do you like your class? Normally they just come to the classroom and say, you are going to do that and that". Another student added, "In the classroom the professor is the one who say what to do. Here, we can even put some things by our own. I believe that could be more interesting here" (Student G, Focus Group, Phase Two).

The motivational influence that was provided by participating in the TELE's design is a relevant finding because according to Granito & Chernobilsky (2012) motivation is important for achieve goals. Motivation is also important for activating Self-Regulated learning strategies (Pintrich, 1999) and a positive factor for using a TELE (Chen & Jang, 2010; Hartnett, St. George & Dron, 2011).

However, in the end some students still showed concern about their motivation in an online setting. For example: "Sometimes we are in our house and feel lazy about working. And in the classroom the professor is always asking for the tasks. And [maybe we] lose interest because the [TELE] program is not so strict" (Student F, Focus Group, Phase Two). Another student added: "How will motivation continue in the next phase when we start the TELE's implementation? What if, as some students said, the semester passes by and we have not completed anything?" (Student D, Focus Group, Phase Two). Some doubts were addressed when students learned that, in contrast to the traditional classroom where professors are in charge of most of the aspects, they could be in charge of setting deadlines and receive specific reminders for each task, if they needed.

Providing an Educational Experience that is Different from the Norm

Students indicated positive reviews of using the TELE: "What I liked the most is that all is really clear and specified here; even the books to use" (Student A, Interview, Phase Two). The students also commented on being in charge of their own educative process and the contrast with their previous experiences. For instance, a student indicated that they were used to "a firm high school style [of learning]" (Student F, Interview, Phase Two). The increase in control and decision

making provided to the students was identified as a real concern. The concerns were associated with deadlines, and how they had spent one academic month (August) working on the study's phases one and two instead of being in class. They expressed concerns about falling behind other students not in the online platform because they started one month behind: "we begin in September; could we get all that finished by December?" (Student F, Interview, Phase Two). Another raised the possibility of advance work to catch the other groups "Should we [be able to] go forward because we are one month behind?" (Student G, Interview, Phase Two). In addition, students were also concerned about "not setting dates from the beginning because we can forget about it…working in the TELE" (Student G, Interview, Phase Two). Learning about how to use the schedule addressed those doubts.

Autonomy, Relatedness and the Possibility of Change

Roblyer (1999) stated that in online education students like to have the autonomy to choose paces and timing of learning. SDT also espouses the importance of autonomy for students' motivation (Deci & Ryan, 2000). Students who used the TELE asked, "May I send first task two, and then task one?", and said they felt motivated by having the opportunity of choice, "Cool, it seems that we are going to be the first [students to be able] to do that" (Student A, Focus Group Phase Two). This idea of choice and control could seem trivial, but the real possibility of choosing how to interact in an online system is one of the main characteristics praised by some researchers (Wise, Bolls, Schaefer, 2008). It was noted that some professors in this study expected students to suggest changes as part of the Phase Two evaluation. For example, professors commented that "[the students will be] asking for not so many tasks" and "[the students will] maybe not be changing the content, but how to receive the class online…what tools the professors and students are going to use" Professor I, Interview, Phase Two).

Students did not ask for major changes, even when they had the opportunity. That could indicate that students did not feel confident to express their concerns, even when feeling empowered with the opportunity to co-design the educative program as part of this DBR process. One student said, "It's cool…the opportunity to choose...the [professors] never ask for your opinion. It's great that they ask about it, how would you like your class? Normally they just come to the classroom and say you are going to do that and that" (Student G, Focus Group, Phase Two). Second, it may

be that the system was presented to students in a manner whereby the design of the Moodle platform did not require changes. For instance, one student said, "I like that all is really clear and specified here... even the books to use" (Student A, Interview, Phase Two).

Concerns with Self-Regulated learning

In Phase One, students expressed a *fear to change*, but still seemed to feel positively about the possibility of choosing some aspects of the subject, for example contrasting the TELE with current teaching: "The school is not giving us enough freedom to act" (Student A, Interview, Phase One). Some professors were positive about students working in the TELE, "As a professor, I think it's good that students give their opinion about deadlines... this way they could be conscious about those dates, and not forget when and how to send in their work" (Professor C, Interview, Phase One).

However, in Phase Two students expressed worries about using the TELE, "For some tasks, sometimes it's good that the professors set the date to deliver; but in others I would like to set my own times" (Student I, Interview, Phase Two). Another said, "Not having a deadline does not motivate me at all. If I am not worried about sending the task and I could let [the due date] pass. So, we must have a date to deliver from the beginning, accessible dates, but dates" (Students, Focus Group Phase Two).

Some professors agreed with these concerns, "I believe that most [students] are going to be overconfident...there is no final date to send it...I really believe that they are going to struggle to cope with this change" (Professor D, Interview, Phase Two). Another professor added, "The [students] are afraid to change. They are accustomed to the professor being in charge, with deadlines and what to do. We come from a traditionalist school, where the professor sets the guidelines to follow... that is why there is concern about working with the new system" (Professor C, Interview, Phase Two).

Finally, and supportive of the fear notion, one student indicated the first mention of *fear of commitment,* when the lead researcher asked; "Do you feel confident to take the subject that way, on your own?" The student replied, "No, I do not feel confident at all. First, because I do not like

computers. I am against the computers… and because I fear working on my own as a commitment" (Student A, Interview, Phase One).

This concept of fear is a major factor to consider for students when using a TELE because it requires a lot of extra time and effort by the students. Ramsey and Lorenz (2016) stated that academic commitment as an academic adjustment "is an important outcome when students set goals and exert efforts to strengthen their skills" (p. 82). It may be that a fear to change detected in Phase One, and apparent fear of commitment on Phase Two, becomes a real fear of commitment when the students come to learn online. This could be explored in Phase Three of this project, when students were provided choice between using the TELE or a traditional face-to-face class.

Impact of working in a TELE in the traditional view of the Physical Education teacher

In Phase One working with a TELE was viewed by the professors as going into the future (e.g., "we will enter the modernity"), yet for students this was more a matter of concern about the future and having a "lack of experience for the future work environment" (Students, Questionnaire, Phase One). During Phase Two, students faced the TELE for the first time, and those concerns seemed to turn into more positive thoughts about using a TELE. For instance, "Before, the PE teacher was like, just the PE teacher. Now all is changing with the technology. They don't even have notebooks, before it was just practice and practice. Now they could include theory and even technology" (Student A, Focus Group, Phase Two).
The Gymnastics 2 professor also felt positive about being part of this project, as shown in this exchange:

> Researcher: How do you feel as a professor, to be part of that design, from the beginning, with the students having more freedom?
> Professor: "I feel good, happy, motivated and with the idea that this change could be productive and be a turning point to facilitate a lot of things for both professors and students" (Professor D, Interview, Phase Two).

The direct engagement in the development of this TELE from beginning to end might assist the teaching team involved in changing their perceptions of the relationship between PE teacher and the use of online technologies.

123

Developing a TELE in a PETE Program

From Phase One to Phase Two, the *theoretical design* of the project (e.g., use of SRL and SDT within a DBR approach to research) supported the feasibility for students and professors. Especially once both students and professors had worked in the real system and experienced the TELE. However, professors made it clear that even with all the good intentions from both students and professors, it could be difficult to change from a traditional system of teaching and learning.

That change could be achieved with the use of strategies as Participatory Design (PD) which is utilized within technology designs and ask the users to contribute on the creative process and not been just passive actors (Sanoff, 2011). PD utilizes tools, (e.g. interviews) to access users' opinions and allow learners to become co-designers of courses. PD has been utilized on technological designs across a range of educational settings (Huang, 2015). DBR considers that approach when stating the need for the design of technological solutions with a full collaboration between researchers and practitioners (e.g. professors, students and administrative staff) in real-world settings (Wang & Hannafin, 2005).

4.3.3 The Final Design of the TELE

At the end of Phase Two a final version of the Moodle platform was developed through the collaborative process described above. Table 3 explains the main features of the whole TELE and how each was intended to support student learning.

Design Feature	Supports learning by
a) Online subject's content was created in text and video	Allowed for different student's learning differences to learn as visual, using pictures and images; and/or verbal, using words in speech or writing. That's a prediction for motivation (Hardre et al., 2006); a main factor of SRL and SDT (Deci & Ryan, 2000)
b) Assessment tasks were authentic	Contrary to traditional classroom assessment, students were asked to perform in real world settings as they actually would once they had finished the degree. Considering students' relatedness (e.g. need to act in real conditions specially if are into online learning) is a main factor for SDT (Ryan & Deci, 2000.
c) Uploading videos via YouTube	Addressed an important student concern for how to send assignment videos in a practical way, and not as complicated as email. Even though it was not the perfect solution (e.g., as upload videos direct on the platform) it was simple enough from student's point of view. Since that was a students' proposed solution, they could see it as relatedness (e.g. take into consideration student's opinions) an important part of SDT (Ryan & Deci, 2000).
d) Tasks were sequenced	Allowed students to achieve particular goals that in the end contribute to the subject's stated general goal. When students can create goals supported by tasks presented in a sequential way, the Self-Regulation process get enhanced Chen and Jang (2010) found that providing contextual support for autonomy and competence to students in an online course positively affected the satisfaction of their psychological needs. The supports included giving students choice and options and giving clear instructions about completing tasks.

e) Online **discussions**	Encouraged students into collaborative activities, giving enough time to think about their ideas and feeling comfortable to express themselves. Also allowed a socialization of ideas on for any theme or answer, through peer discussion. An important factor to SDT is the fulfil of physiological needs (e.g. relatedness and autonomy) (Deci & Ryan, 2000). Those needs could be covered with online discussions because allowed students to understand each task and give a space for ask for doubts what can facilitate Self-regulation of listening (Wise & Hsiao, 2018).
f) Schedule	Allowed students a system for Self-regulation; where they could understand, planning, practice and handle the Self-regulation process. That system asked students to decide times and ways to do their tasks what can enhance Self-Determination (Paraschiv, 2000). For Chen and Jang (2010) satisfaction of students' psychological needs in online settings can be reached by providing contextual support for autonomy and competence.
g) Continuous assessments' activities with feedback	Not just knowledge tests with grades or scores, but continuous activities with feedback to achieve a full project. The relieved pressure about grades and focused students on working to complete the project and not to just demonstrate knowledge on a test. To Roca and Gagne (2008) when people feels competent are willing to continue with eLearning, because feels competent influenced their level of motivation to continue. For Wulff, Hanor and Bulik (2000) interaction, as feedback, is also key in online learning.
h) Student choice of **personal communication tools** and feedback (WhatsApp)	Allowed students to work in familiar communication environments and receive feedback in real time. Activities that promote choice's opportunities have been showing to enhanced SD (Wehmeyer & Shogren, (2016). Also, interactions with others deal with SDT-SR's factors as communicating and listening (Paraschiv, 2000).

Table 3: Design features of the final TELE

In Phase Three, the *practical feasibility* of this model was to be tested in a real word setting.

4.4 Phase Three: Implementation and Testing of Design in Practice

Phase Three was focused on evaluating and testing the TELE's design in the real educative setting. Moving to online learning was seen as a risky move for the faculty's Dean which is why he approved the TELE to be used with a maximum of 10 students before any possibility of using it with the full cohort. Basically, 50% of students (n=33) and 86% of professors (n=56) from the questionnaire considered the real possibility of using a TELE. This number decreased to 37% (n=24) students after signing the intent to participate questionnaire for considering joining a virtual class in a PETE program. From those 24 students, 13% (n=9) accepted to be part of the class in Phase Three.

The lead researcher collected information about this phase through quantitative data from the Moodle system itself and Personal Interviews with the professors who taught the class and the students. Data were collected before, during and after the use of the TELE, using questions like:

- Do you feel like you have choices about some aspects of this subject?
- How motivated do you feel to work in your tasks in this context?
- How do you think a TELE can change the face to face interaction of PE?
- Do you feel that using the TELE changed your need for support?
- Does using the TELE help you to work like a student in a different way?
- Was the independence to work in the TELE an issue for you?

The initial phases were focused on the development of the final version TELE, with this phase as the "real" implementation of the educational experience. The application of design-based research to this phase is shown in Figure 16. As in the two previous phases, this chapter presents only results directly related with self-determination, Self-Regulated learning and the faculty's organizational culture influence. However, readers can find a list of minor themes from Phase Three in Appendix 15.
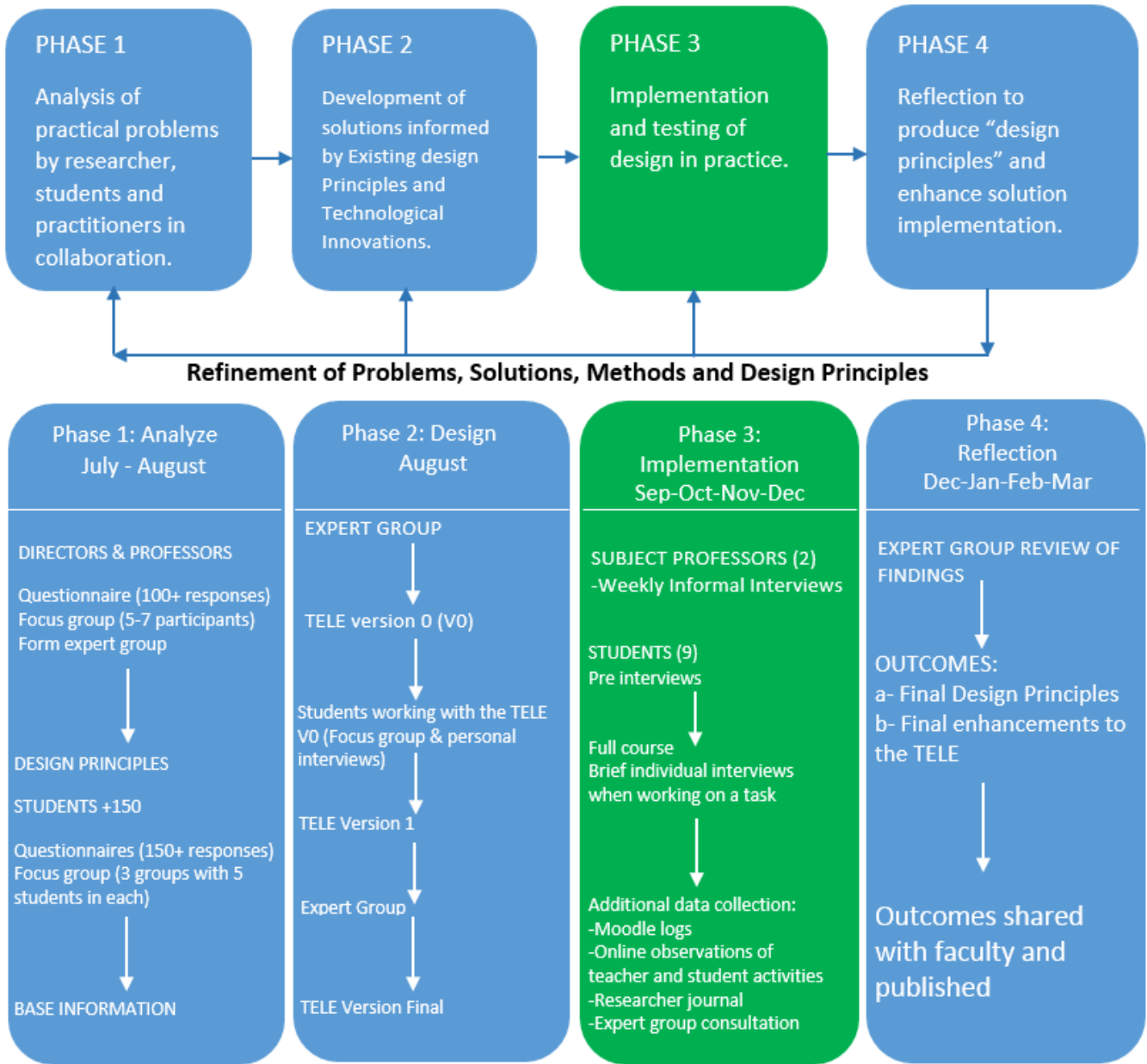
Figure 16: Application of Design-Based Research on Phase Three.

From this phase, the major results related the concept of students' self-regulation. A summary of the main findings is presented in the next section. For more detailed researcher notes about each student's work in the TELE, please refer to Appendix 19.

4.4.1 Students' Self-Regulation

The self-regulation process is a very important component in any human activity (Kinniburgh, Blaustein, Spinazzola & van der Kolk, B., 2005; Baumeister & Vohs, 2007; Heatherton, 2011). Research illustrates the importance of self-regulation when working in digital environments (Johnson and Davies, 2014) and TELEs (Carneiro et al., 2011). Contrary to the general perception of self-regulation as a trait of a person (e.g., you are born with it or not), researchers state that the self-regulation is a process that can be taught and learned (Pintrich, 1999; Harris et al., 2010; Zimmerman, 2002).

From the initial interviews and focus groups in Phase One, it was clear that students demonstrated a level of self-regulation outside the school setting. Nine out of ten participants explained they used self-regulation skills outside school (e.g., sports activities) but not in school. Only one admitted to using self-regulation strategies within the school setting: "Because, we have to be planning to do well in school". Other students demonstrated concerns about their self-regulation skills and were worried about the semester passing by and "we do not make anything" (Student G, Interview, Phase Three).

That was exactly what happened with one of the students once started in the TELE. "The time passed by and when I wanted to finish all [the assessments] it was too late, and I preferred to quit… not logging into the platform." (Student H, Interview, Phase Three). The question that arises regarding this student is whether that student did have and use SR skills in non-academic environments; and it was a matter of just adapting it to the TELE environment. From previous literature it is understood that the self-regulation process must be learned or adapted especially when students are in new environments (Cleary & Zimmerman, 2004; Dabbagh, 2007) and students need time to be taught. This concept of learning and time is relevant as both students and professors were working through this process with the TELE.

Finally, according to the professors' expectations, changing the strong background of professor guided teaching, even when students were interested in trying the new system, was difficult when focusing on self-regulation. This was expressed by one student who started using the TELE but did not finish, "I did not give myself my own space and time to work the subject"

(Student H, Interview, Phase Three). That is congruent with (Brophy, 2010) who stated that students can suffer under new more autonomous environments (i.e., online environments). From these findings we can support previous research whereby the self-regulation of students for using a TELE is a difficult task, even for students with well-developed Self-Regulated learning skills (Bernacki et al., 2011).

4.4.2 Self-Regulation Skills to Work in a TELE

Time management: A main theme identified within Phase Three. Students in previous phases considered using the TELE as a good strategy to "easily adjust free time" and "because we could use our free time better" (Student E, Interview, Phase One). While the students initially viewed the idea of choice with time as a positive, professors had reservations about students' possible lack of time management skills: "They [students] will say: I'll do it later, but will not" (Professor D, Interview, Phase One). Professors in Phase One had suggested that "not all the students are able to self-regulate…be autonomous" (Professor E, Focus Group, Phase One).

In Phase Three, students demonstrated some ineffective strategies and behaviours to adjusting their free time in order to work in the TELE. Work from other classes and life commitments were time consuming, for example: "I have a lot of work and assignments [from other subjects] and did not have time for the platform" (Student D, Interview, Phase Three). Another student stated, "I could not accommodate the time to work in the platform… I thought that I could have [time] but, no" (Student H, Interview, Phase Three). This last comment suggests that it may not be a lack of time that was the problem, but a sense of how to accommodate or prioritize their study time. Previous research has indicated a relationship between time management skills and self-regulation (Terry & Doolittle, 2008; Kwan 2010).

The theme of time management was consistent with professors and students' fears. Professors had predicted that "[students] are going to struggle to match this change [to be more Self-Regulated]" (Professor D, Interview, Phase Two), and students had anticipated "I'll do it later, but will not" (Student H, Interview, Phase Three). To support the lack of time management, it was noted from the Moodle logs that 75% of the tasks were completed in the last month of the subject. Table 4 provides more detail about when specific tasks were submitted by students over

the course of the subject. As shown, students did receive reminders about submitting tasks, but it was not until just before the final interview that they completed their work.

Sept	October	October	October	November	November	November
1st reminder		2nd reminder	Interview	3rd reminder		Final Interview
	Task 1				Tasks 2, 3, 4	

Table 4: General overview of task delivering for each month during Phase Three.

It is important to note that the students and the professor agreed in the previous phases 1 and 2 that maybe "two weeks could be enough time to finish the [material and work in the] subject" (Professor G, Interview, Phase One). This suggestion aligns with the comments from Chapman (2015) from Arizona State University's online programs, about how they structured online courses using a seven-week session compared to a traditional 14-week semester. However, they also expected students to spend at least six hours weekly for every online course; which is more than the hours (four) officially required by FPCS for Gymnastics 2, the subject under study (See Appendix 20). These finding highlights how even when students and professors seem to understand the possibilities of online courses (e.g. create their own schedules), they apparently have no a clear idea about the amount of time required to work in this modality, nor the time management skills required for this.

Asking for help: For many people the idea of asking for help can be a sign of failure (Huet, Dupeyrat & Escribe, 2013). Not asking for help is a regular behavior for some students due to a variety of factors, including a lack of knowledge, being disinterested and/or not understanding what the teacher is talking about. In this study, only three of the students asked for help at some point during the project. An interesting finding was that at the end of the TELE only the students who had completed the entire subject had asked for help and provided their opinions about how important it could be to give more help to the students with setting deadlines and giving reminders close to those deadlines. Researchers indicated that asking for help is a sign of self-regulation (Newman, 2008; Williams & Takaku, 2011; Ryan, Gheen & Midgley, 1998). Specifically, a student demonstrating high self-regulation possesses the knowledge of when and who to ask for help. However, not asking for help is not necessarily a sign of low self-regulation

because seeking help is a complex process and not just a matter of students knowing that they need assistance (Ryan, et al., 1998; Aleven, Stahl, Schworm, Fischer, & Wallace, 2003).

Instead of asking for help, some students in this online setting decided to lie to the professor about their progress. This could be because students believed that the professors would not be there (i.e., were not present) and the student would not get caught (Moten, Fitterer, Brazier, Leonard & Brown, 2013). An additional reason could be as simple as that students did not have enough experience with online education and did not know how easy is to the professor to track their work in the online system. To find a reason why, we asked one of the students (Student G, Interview, Phase Four) who was not totally honest about sending tasks:

> Professor: Did you lie about anything during this study?
>
> Student: No, but sometimes I was tired because of the school or the practical classes.
>
> Professor: Did you know about some peers lying about academic aspects?
>
> Student: Yes, a lot of my peers in health classes (one of the most difficult classes from the students' view) with professor Pardo.
>
> Professor: What is a reason for a student to lie to the professor about something about their class?
>
> Student: If we said the truth to the professor, he could say, "That is not a reason to not send the task".

Forgetting to self-regulate: Students stated in the beginning of Phase Three that they could not forget about working in the system because they would be always thinking about it: "ah, the subject; I have work to do, every day" (Student H, Interview, Phase Three). However, from the initial interviews during Phase Three some students stated that did not work on the subject because they forgot to complete tasks. At the beginning, students did not use the schedule, and some seemed to be not surprised when asked about it and/or actually lied about using it. For example, one said, "ah! the one about the date? Yes, I did it, and then the homework" (Student G, Interview Phase Three). A quick review of that student's work in the Moodle platform demonstrated that he did not use the schedule and did not send the work either.

Even when students expressed motivation to self-regulate by "working at my own rhythm" and "there is not pressure for sending the works" (Participants, Moodle Forums, Phase Three) and made comments reflecting the reported self-efficacy of the FCCF's students (Blanco et. al., 2010) such as "if I put a lot of effort, I can do it", they only submitted their work in the platform *after* receiving reminders. Thirteen days passed by after the first interviews with no activity. Students explained later: "I forgot. Maybe it could be good to send reminders for each task" (Student I, Interview, Phase Three).

Students also suggested that setting the deadlines for themselves was not a problem. This is congruent with students' positive comments in Phase Two about the opportunity to control their pace of working with the schedule (e.g., self-regulation). This was also reflected in later comments in Phase Three that working was different in the TELE because they "do not like to work under pressure and the way the subject is right now is easier…you have your time and you can accommodate it" and how they had "choice what to do and when" (Student I, Interview, Phase Three). Despite these positive comments, they did not self-regulate their time and effort in the TELE.

4.4.3 Self-Regulation Occurring by Convenience

Many of the reasons for students using the TELE seemed to be grounded in the concept of *convenience*: "For me it will be so much easier because of the work and the distance. I live far away from the University, and it takes me so much time to come here", and "For me could be better. Will be not so hard, we will have time and desire to make things. Especially if I need to work" (Student I, Interview, Phase Three). These comments suggest that students like the flexibility of working in the TELE as a main factor. This suggests that for these students the self-regulation process seems to be more influenced by the *need* for using the TELE because a lack of time (e.g. organizing study around a job or living far away from the University) and not for an *understanding* of the personal and educative benefits from the TELE itself. This finding supports the possibility that students are embracing this online study path without understanding the real benefits of online learning, or if could be compatible, or not, with their own personal styles of learning. As such, faculty staff and professors must be aware to detect not just whether students have the skills needed for online learning (e.g., self-motivated and responsible) but how the

TELE's design could increase those skills (Gilbert, 2015), along with students' participation and understanding of a TELE's benefits.

4.4.4 Beliefs About Self-Efficacy and Expected Outcomes

During the use of the TELE, students answered questions about how they felt about the TELE system. The responses were generally positive and based in their self-efficacy beliefs and expectations: "I can make my work really good, searching for mistakes, without stress or the pressure of having to send it in on a specific date; and with that I can give more quality" (Student H, Interview, Phase Three). Some students even talked about how easy they felt that it was to use the system, "I expected it to be more difficult to work in the platform" (Student I, Interview, Phase Three), even if they had asked for help for not being able to use it.

Most students 53% (n=35) perceive with the capacity to take online classes (See Appendix 17, item 14), a condition to self-regulate (Zimmerman, 1990). However, that was not aligned with actual behaviours of students in Phase Three as evident from only 2 of 10 students completing the subject. One reason for this result could be that the expectation of a very good reward for using the TELE (e.g., to have more time or being able to take a subject they had failed) was a factor for them overestimating their self-regulation and self-efficacy levels. Researchers Williams (2010) and Bandura (2007) suggest that higher expected outcomes (e.g., more freedom, working at their own pace, working in a new learning environment) can influence self-efficacy ratings and students' perceptions of being efficacious. An issue that arises is that if expectations are too high, the students' beliefs of self-efficacy could be overvalued compared with reality. Although students showed high levels of self-efficacy on the Phase One questionnaires with

4.4.5 Using a TELE in a PETE Program

From previous phases participants agreed that the system seemed to be good enough. The outcomes from phases one and two, in terms of the theoretical design of the project (e.g., use of SRL and SDT with a DBR approach to research), showed it as feasible for students and professors. In Phase Three, the practical feasibility of the TELE model was tested in a real world

setting. The professor created a four step process that students needed to follow in order to be able to receive the approbatory note for the subject:

1. Students chose a movement from a gymnastics' basic textbook. The professor guided students by creating a rubric (Table 5) to help them break down the movement in order to learn all the movement's parts and the steps needed to teach it.

2. After students completed the rubric they created a theoretical presentation on video in order to demonstrate they understood the concepts and explain how they would teach the movement to an adult (peer) (Figure 17). They received feedback from the professor.

3. Students were required to teach the movement to another adult. Here, with the professor's help, students learned how to translate the concepts from the rubric into real world instructions to teach a movement. After that, students sent a video showing how they taught the movement, step by step, to a peer (Figure 18). Again, professor gave feedback and decided whether the student was ready to progress to the next stage: to teach the movement to a child.

4. In the final step students were allowed to teach the movement to a child following the rubric with the description not just of the movement, but the steps needed to teach the movement (e.g. common mistakes, physical preparation needed to learn that movement, etc.). Here students had to find an appropriate child to work with. For example, one student used a relative (cousin), while another student worked with a child from his PE class (see Figure 19).

After these four steps students were able to receive final feedback from the professor and receive the final grade for the subject. From the initial 11 students, only 2 progressed to the point of actually try to teach the movement to a child (students 2 and 4). Both, received the approve note from the professor. One of the students illustrates the possibilities of using a TELE in a PETE, because neither the researcher and the professor met face-to-face with that student. All the meetings were via telephone, video calls, WhatsApp messages and videos via YouTube (for a wider description of that students see appendix 19: student 2 & student 4).

Exercise name			
Exercise stages	Main	Exercise stages	Main
Diagram		Diagram	
Technique		Technique	
Common mistakes		Common mistakes	
Methodology		Methodology	
Physical preparation needed to make the movement		Physical preparation needed to make the movement	

Table 5: Rubric to break down a movement in parts
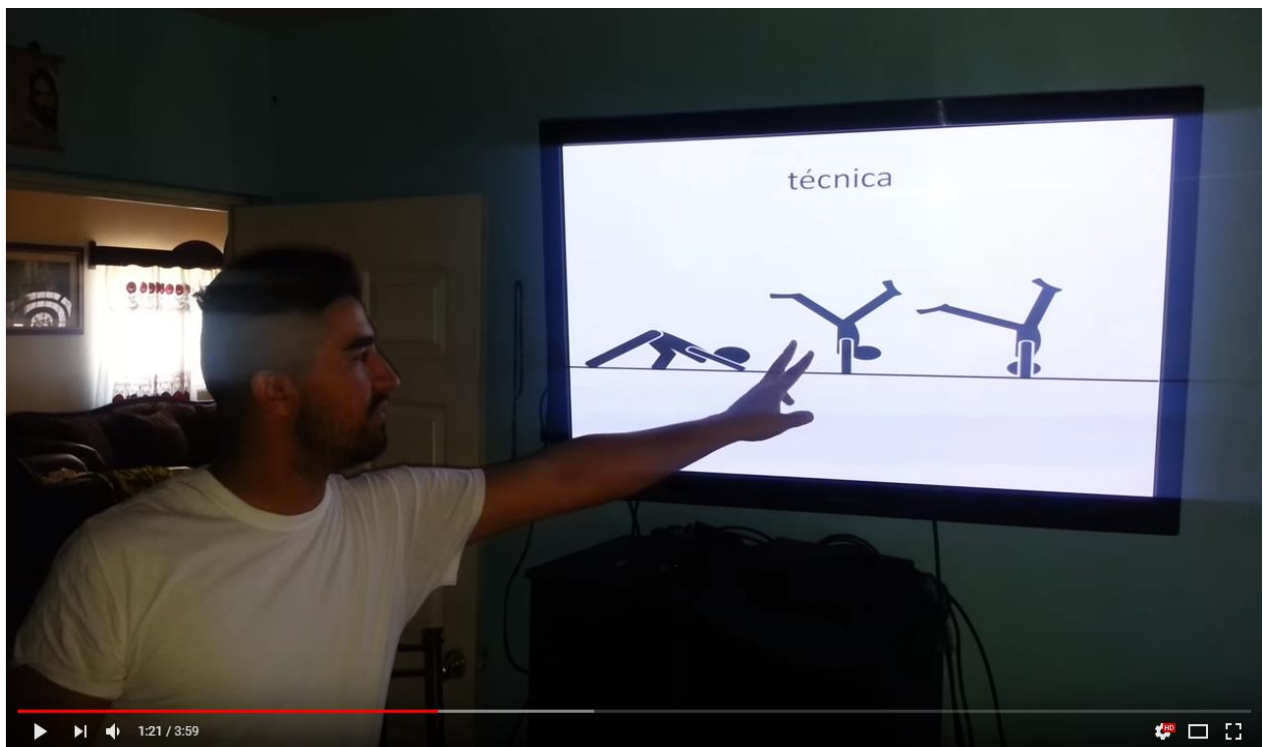
Figure 27: Student 2 showing a theoretical presentation of the movement

Figure 38: Student 2 teaching the movement to a peer

Figure 49: Student 4 teaching the movement to a child

In addition, all participants, regardless of whether they failed or approved, said they felt the TELE was 'real' and almost the same as a classroom class. An interesting finding was associated with the initial positive comments and interest. According to the questionnaire data, 80% of the students wanted to use it, but most did not actually volunteer.

The participants who failed to use the TELE in Phase Three pointed to personal issues and not the TELE itself as the reason they failed. However, elements such as social bias (i.e. the tendency to express positive opinions to professors or researchers) may have been present during all three phases and could be one reason for the lack of negative feedback about the system.

In addition, data showed a change in both professors and students' negative predispositions to using a virtual class in a PETE program. The same professor who said in Phase One, "I do not believe my subject could be taught online" (Professor C, Focus Group, Phase One) changed his opinion after learning more about TELEs, SD and SRL in Phase Two. A positive change in mindset was still accompanied by some doubts about using a TELE: "I would like to start [using the TELE] as a support and then go on putting it little by little", but in the end he stated that "I think that I could [use the TELE], all the changes destabilize us just because we do not really know about the subject [TELE]. We come from a traditionalist school that is why we are afraid to face this new system" (Professor C, Interview, Phase Two).

4.4.6 Using the SR Schedule and the Self-Regulated Student

This study used a schedule for each task, which followed a self-regulation process based in the model by Andrade and Bunker (2010). This schedule, as a self-regulation tool, allowed students to understand, practice and manage the self-regulation process by deciding when and how to work on the tasks. Students could not only schedule their own working times (e.g. how many days do you think to need in order to complete this task?) but utilize any means or software that was considered appropriate to work each task. They could also consider the need to receive, or not, a reminder from the teacher before the task deadline.

But, what was the students' perception about that tool? Did they feel that using this schedule was helpful? At first, they forgot to use it for the first or second task, but after that there was a

tendency to use the schedule tool, via Facebook or Moodle platform, before sending the task. Furthermore, students seemed to agree with the utility of this schedule, and not only for their academic life: "I feel that there is more control. In the long run you get accustomed to working with more control and when you begin to work like that…you can have more control also in your everyday life" (Student H, Interview, Phase Three).

Self-regulation was a main topic in this study. For students, using the schedule could help them to be more self-regulated and plan and adjust their work on a task:

> If something goes wrong, you can change it… you can say whoops!! It did not work that way, let's see other way. And in the end, you have the time to deliver, the goal…so you have more time to make changes to exercises until you reach the goal. (Student I, Interview, Phase Three).

In practice, all students had some level of difficulty in using the schedule tool. From nine students, five did not work at all (with one dropping from the study just starting phase three); four engaged with the platform, by sending at least one work, and from those, only two finished and passed the entire subject (For more detailed researcher notes about each student's work in the TELE, please refer to Appendix 19). Furthermore, even these students had difficulty at the start of the subject using the self-regulation tool. It was necessary to send reminders to each student to utilize it. It was an interesting finding that even though the TELE was a more autonomous environment, students still desired the external reminder at the end of the TELE.

Students considered that the schedule system, having to set deadlines and asking if they needed the professor's reminders, is a good idea because "maybe the time could pass by and we cannot do the work and with the option of the schedule, yes. A good idea" (Student A, Interview, Phase Three). One student even considered using it in their classroom-based settings because before using the schedule self-regulation was "dependent on free time, for example, between homework or exams… I did my work" (Student I, Interview, Phase Three). This suggests that students appreciate the schedule feature as a support tool, not just in online education but into the classroom. However, the schedule's final design must cover important aspects in order for it to be

a really effective tool, for example automatic sending of reminders when task deadlines are closer, and it needs to be easy to use and send (i.e., not to being attached as a word sheet).

4.4.7 Support for Students' Basic Needs when Working in a TELE

The model for the TELE used in this study was based on elements of Self-Determination Theory (SDT) (Deci & Ryan, 1985). SDT espouses that if the context (in this case the Faculty) supports peoples' three basic psychological needs of autonomy, competence and relatedness the person will be motivated to act (Deci & Ryan, 2000). This motivation in turn could provide the catalyst to students applying and working with the self-regulation skills within the TELE. On this study two psychological needs, competence and relatedness were identified for students as being well supported with autonomy apparently not been totally supported. However, the SDT states that satisfaction of all three needs must be covered, in order to reach a full internalization of behaviours (Deci & Ryan, 2012).

Competence

The need for competence seems to be supported through students expressed being able to work in their own rhythm and their own pace to be successful: "In the other subjects in the classroom, I get affected because I had to be absent a lot, which affected my notes. In the TELE I feel helped because I was working online" (Student G, Interview, Phase Two).
However, at the same time competence appears to be compromised during this TELE's application. Professors believe that students are not ready to work under a Self-Regulated environment: "Students are afraid of change, they are used to receive everything from the professor, the guidelines, datelines, what to do and how" (Professor K, Pesonal Interview, Phase Two). Even students stated that sometimes they really don't feel prepared to be in charge of the academic control of the Moodle platform (e.g. datelines and tasks' reminders) because of personal issues (e.g. need for time to work) or academic needs (e.g. lack of self-regulate skills) "- we need- a teacher giving us face-to-face support, because working in a PC we can be lazy and not do it" (Student A, Focus Group, Phase One).

That is important because Competence is a main psychological need that, even alone, can support students' positive outcomes (Artino, 2008; Johnson & Davies, 2014) specially on sports

related environments (e.g. Physical education) (Fransen, Boen, Vansteenkiste, Mertens, & Broek, 2018). Also, from SDT, any mining in competence's support can bring negative effects on student's performance (Radel, Pelletier & Sarrazin, 2013) as apparently happened on this study.

Relatedness

Relatedness was apparently supported by students' feelings that they were cared about within the TELE: "It's great that they [professors] ask about, how do you like your class? Normally just come to the classroom and said: you are going to do that and that" (Student G, Focus Group, Phase One).

However, relatedness alone has been showed to not been enough to support student's motivation and predict students' outcomes (Jang, Reeve, Ryan & Kim, 2009). According with that, on this study, even when students feel supported on relatedness; they did not perform well in the whole project; with just 2 of 10 students working the TELE.

Autonomy

Autonomy is one of people's three psychological needs (SDT, 2016) that even alone, has showed to be a supporting factor for utilizing a TELE (Bernacki et al., 2011) and specifically for motivation on learning in physical education settings (Shen, McCaughtry, Martin & Fahlman (2009). That need for autonomy is important because if the context thwarts autonomy, this can impact student wellness (Deci & Ryan, 1987).

However, on this study's whole context, the need for autonomy seemed to be unsupported when students stated that "the school is not giving us enough freedom to act" (Student A, Interview, Phase One). Even when the TELE was intentional in supporting student autonomy and that support for autonomy was strongly aligned with the Faculty's academic model, the experience was deemed unsupportive.

That apparently limited support for autonomy (i.e., experience behavior as volitional) within this Faculty seems to be compromised by two aspects. First, students felt unsure about acting with autonomy and taking carriage of their own learning process. Students expressed worry about forgetting to do the tasks by themselves, suggesting they were not confident in taking control of

their learning, "we could go wrong [in the subject] because we forgot and say, 'I can make it later, this is virtual' but then I don't" (Student C, Interview, Phase One). Second, the context in this faculty (i.e., the organizational culture) was not generally supportive of autonomy. Students and professors felt a desire and pressure to not be absent and the potential knock-on of "missing" class, "asking about what would happen with the absents, how are we going to handle the absents?" (Professor I, Interview, Phase One). This concept of feeling pressure to not miss class could come from their previous experiences that use technologies. Specifically, all University students must enrol and complete a first semester subject 'Information and Communication Technologies' (ICTs) which is taught using a blended approach. Students complete some tasks in classroom and some others online (e.g., Kiviniemi, 2014). However, those online tasks must be worked on only during the class' scheduled time, "we needed to come to the faculty, sign up into the platform and work online only during the class hour" (Student C, Interview, Phase One). Instead of help students' autonomy to act that created some doubts. Students stated that "do not like to work under pressure" and preferred "choice of what to do and when" (Student G, Interview, Phase Three). Furthermore, professors felt pressure from the administrative staff to assign grades only during the official dates, "the dates [for grades assignment] will be already established and I will have the pressure from the faculty's administrative staff to put qualifications" (Professor I, Interview, Phase Three).

To sum up, in a non-autonomous environment like this one, one key element of SDT, autonomy, is not whole supported and this can have a significant impact on the motivation of those involved in the experience. Since motivation is a basic part of self-regulation, the lack of autonomy may also mean that the self-regulation process could not be fully supported (Ryan & Deci, 2006; Gorin, Powers, Koestner, Wing, & Raynor,2014).

Finally, it is not a matter of which TELE, tool or educative system is used, there is a need to understand how the educational context (i.e., Faculty) and organizational culture can influence the behaviours, desires and psychological needs of students and those charged with teaching classes.

4.5 Phase Four: Reflection to Produce Design Principles and Enhance Solution Implementation

In Phase Four, following the quality's ensuring strategies as peer review, the review of the findings determined the final design principles and elements of the TELE. All findings were discussed with the expert group to assist with interpretation. As noted, this was the last phase for this PhD study, but the design principles utilized in the TELE will continue to be refined as new goals arise for future work in other subjects. The final outcomes will be shared within the faculty and through publications, including the final thesis.

The application of design-based research to this phase is shown in Figure 20.
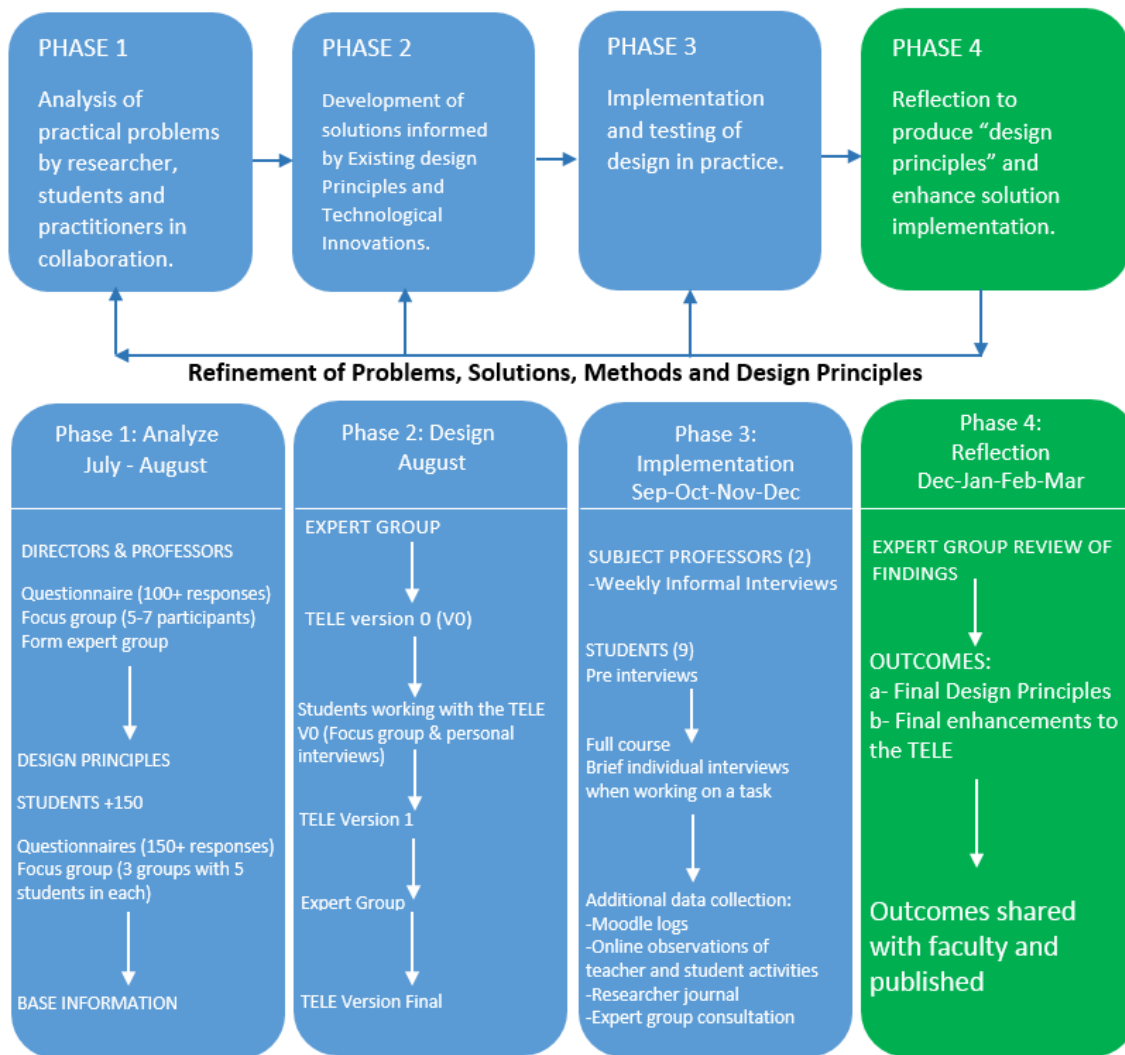
Figure 20: Application of Design-Based Research on Phase Four.

Results in this section are different from the previous three because this is a review from the experts, students, professors and academic staff to present the final design principles, final enhancements to the TELE and the expert group review of findings.

4.5.1 Final Design Principles

Herrington and Reeves (2011) suggest that design principles are: "recommendations for designs that enable teachers and instructional designers to use well-researched ideas as guidelines for their own efforts to enhance student engagement and learning outcomes" (p. 595). This study followed the design principles from Oliver (1999) regarding web materials using new technologies (e.g., use authentic assessment activities) and combining these with the UACh CECAD recommendations (e.g. didactical sequences). Security related and technical design principles (e.g. Interface Design and Technical Services and Support) were delegated to the CECAD specialists, who also addressed some pedagogical issues. This process was used as suggested for DBR to help to clarify the researcher's role as investigator, not as a designer; and to utilize support from specialists as needed (Herrington et al., 2007). For a full list and explanation of the initial design principles see Appendix 13.

These initial recommendations for design principles were then compared with those that were already being used in the AUCh and in the specific subject that was the basis for the TELE, 'Gymnastics 2'; all that with help of the titular professor. After that, those Design Principles were presented and discussed with the expert group and some recommendations comes out from that meetings. There was an alignment with certain principles, but changes were needed, as noted by one of the professors in Phase One, "Actually the programs are ready, but in practice we change and use other strategies. The program was developed in a collegiate way, just because is a requirement; however, we change the strategies" (Professor G, Interview, Phase One). The design principles were then reviewed and developed into a final set of principles used for the design of the TELE (see Table 6).

Instructional & Audience Analysis
1. Subjects must be viable to go online: "Students learning must be guaranteed with the elements that we [AUCh] have, both pedagogical and technological. If that is guaranteed there is no problem [in migrating a classroom class to online]" (CECAD, Personal Interview, Phase One).
2. Students must have a previous course to learn to use the TELE.
3. Students must have a self-regulation helping tool (schedule-SRL)
4. Students must decide some aspects of the online subject based on their own skills (competence-SDT)
Teaching Strategies
5. Teaching strategies should reflect personal teaching philosophy.
6. Every students' contribution or opinion must be taken into consideration (relatedness-SDT)
7. Develop and encourage collaborative activities among learners.
8. Students must be allowed to show new ideas to achieve a goal (autonomy-SDT).
Instructional Activities
9. Content should be sequenced and structured in a manner that enables learners to achieve the stated goals (Competence-SDT).
Evaluation
10. Evaluation should be based on authentic assessment activities and come from the completion of a project, not just from test grades (Competence-SDT).
Goals
11. The subject goals must be changed as needed to fit with the faculty's goals and be congruent with the subject tasks (Competence-SDT).
12. The program tasks will be designed as a sequence of steps. Each aimed at achieving the overall subject goal (Competence-SDT and SRL).

Table 6: Final design principles and relationship to SDT and SRL.

4.5.2 Further Enhancements Needed to the TELE

Throughout the study students kept saying that the TELE was good enough and did not require any changes. However, in the last part of Phase Three, after facing some issues, students did identify some areas that needed to be addressed. Most of the following issues were taken into consideration before starting the study. However, some University's factors as lack of technology support (e.g. not having their own online video uploader system) or pedagogical fails (e.g. not developing students' online skills) were determinants to take the decisions that were made about the TELE. The following changes will be implemented in a future version of the TELE:

a) The tool for sending videos must be part of the platform and not an external website solution such as with YouTube. Using an external site may cause not just extra technical issues for uploading the video and is an extra distraction to student's effort toward regulation (i.e., managing their attention). Students will spend extra time working in an external site in order to fulfil an academic task which can facilitate a number of additional problems that are unsupported by the university. This happened when one student sent a video via Facebook and not the YouTube link which resulted in the student not having his task registered. As of January 2018, the AUCh's Moodle is now allowing upload of videos directly to the platform (See Appendix 21).

b) The schedule tool must be an interactive tool and embedded into the Moodle platform for ease of usability. The initial creation of the schedule in a Word document was deemed ineffective. Students used it as a Word document, but needed some extra steps, such as downloading the schedule, saving the document to their computer, completing the required elements and finally uploading to the platform. These cumbersome steps seemed to influence the student's effort regulation. We asked the technical experts for an interactive tool, but they did not provide it, even though there is one available in the official site of the program (Moodle).

c) Even when we used the video that the professor used in the classroom for clarifying the exercises and the nature of the tasks, the professor who taught the TELE suggested there was a need for a video that was even clearer so that students could avoid misinterpretation.

d) The system must have an automatic tool to send programmed reminders to the students without the professor's intervention. A reminder tool would facilitate a decreased level of

pressure perceived by students. It should be noted that this element was requested at the beginning of this study, yet the technical expert was unable to add this to the TELE.

e) Both students and professors identified a need to have a chronological chart for student progress. This chart would allow for a quick reference to see how students were progressing within the class, as well as assist the professor in making informed decisions about which students needed prompts. As of January 2018, the University's Moodle is now showing some kind of chronological chart but still not the clear and visual one requested from CECAD (See Appendix 22).

f) Even though our students had worked in the Moodle platform in Phase Two before using it as part of their studies in Phase Three, the professors were concerned about the students' online skills. The University has a course about working with online technologies but is mandatory only for students and professors who want to work in online education. This study suggested that because this Faculty's students are using at least some kind of technological academic support (e.g., AUCh's institutional email) similar courses must be mandatory for all students in this Faculty.

It is important to note that though the collaborative group identified within this study was able to create some of the tools that were requested in the TELE (e.g., interactive schedule and chronological chart), we had decided not to implement them because we wanted to use the TELE under the same conditions as any other subject in the University. In other words, we did not want to add special features that were not already available in AUCH's Moodle. This choice tested the design and implementation under real conditions, but also highlighted the issues above where better tools could have helped.

A further observation is that some of the design principles used in this study were already known by professors. However, they agreed that (1) they do not write them into the subject's program and (2) even if they were a requirement they might not be used in the classroom because nobody (in the Faculty) is checking. However, creating a set of design principles like this is still important because this could mean that professors will not begin from nothing if they decide to create their own TELE.

4.5.3. Expert Group's Review of Findings

In Phase Four, the expert group met again to review the findings from the project. This group brings together experts from the University in pedagogy, psychology, use of technologies on the design of a TELE, creation of questionnaires and application of interviews, and didactics and pedagogy of Physical Education. The group helped to ensure the quality of the study by reviewing emerging findings and tentative interpretations related to key aspects of the research as illustrated by the example below:

> Question: How do professors experience teaching in a technology enhanced learning environment designed for Physical Education teacher education?
> Finding: For some professors online education goes against the humanistic idea of Physical Education because there is a possibility it will create "cold" professors.

For the full findings obtained from the expert group, see Appendix 23.

The following are the findings from the review most closely related to the study's goals:

How can Self-Determination Theory and Self-Regulated learning be applied to design an effective Technology Enhanced Learning Environment (TELE) in Physical Education Teacher Education (PETE)?

How do students, professors and university staff engage with a TELE in PETE?

How does the organizational culture affect the effective design and application of a TELE?

1. Experts agreed with the researcher's findings about students, professors and staff behavior (e.g. their fear of change about their work in the system) is related to the question about, how do students, professors and university staff engage with a TELE in PETE? That fear of change, should affect their academic performance specially on that new and online academic environment. Also, how the context (e.g. professors, staff and administrative regulations) seems to affect in a not positive way to this more autonomous environment.

2. Experts supported the idea that the Faculty's professors were working within an academic model that did not support online education or students' self-regulation of their learning. Experts also suggested that the University should migrate to a new model that truly supports autonomous learning. Supporting that suggestion, six months after the end of that research, the AUCh presents a new academic model to work on.

3. Experts raised new considerations such as 'the hidden curriculum' and the organizational culture. For example, they suggested that students and professors have learned particular behaviors inside the Faculty (e.g. lack of autonomy) that are common because they are easier and convenient. That supports the need for a research about the organizational culture on this Faculty.

   Findings 2 and 3 were related to research question 3; how does the organizational culture affect the effective design and application of a TELE?

4. Finally, experts agreed that this Faculty is not following the actual competence's based academic model and from that is not working toward the support of the self-regulated autonomous student, even when that is a UACh's main academic goal. That is related to research question 1; how can Self-Determination Theory and Self-Regulated learning be applied to design an effective Technology Enhanced Learning Environment (TELE) in Physical Education Teacher Education (PETE)?

4.6 Summary

This chapter described the four phases of DBR utilized within this study, presenting results and findings for each phase. In addition, findings illustrated how professors, students and administrative staff handled working on a TELE from beginning to end. Findings showed that both professors and students, even when indicating some doubts, manifested a positive change in their mindset toward using a TELE. Autonomy appeared as a self-determination factor apparently not fully supported by this Faculty and within this study, yet the needs of competence and relatedness were supported. As for self-regulation skills, the need to teach students to be able to utilize the SR process every day and bring it from non-academic environments to academic spaces seems to be a constant through this study. The following chapter 5 will try to answer the study overall questions about the implications of the design, development and implementation of a TELE in Physical Education Teacher Education.

Chapter Five: Conclusion

Biddle, Hagger, Chatzisarantis and Lippke (2007) combined motivational theories, instead of comparing or separating them, to assist in providing an enhanced understanding of their relevance and obtaining more appropriate explanations. Following this advice, this study used a hybrid Self-Regulated learning (SRL) and Self-Determination Theory (SDT) lens within a design-based research methodology. Data collection and analysis used a qualitative case study approach to examine the dynamic elements for implementing a technology-enhanced learning environment (TELE). The study addressed the lack of inquiry around online education within Physical Education Teacher Education (PETE). As such, this study provides an initial inquiry into the implications of the implementation of online education within a practical movement-based subject, such as those common in the study of PE. Specifically, this study contributes to and extends the body of knowledge around SRL and SDT within an online educational setting. Finally, this study will assist in understanding the elements of design principles that could be used as a base for future designs and implementations of TELEs, specially with areas and subjects traditionally relying on practical activities, such as PE; as well as within other higher education settings more generally.

This study was conducted within a multi-phase design and was undertaken in collaboration with the key stakeholders in the academic environment of students, professors and administrative staff. In each of the phases, there are particular findings which have been presented in chronological order to illustrate to the reader the path that was taken and the findings associated with the study's purpose. Overall, using the TELE in Phase One seemed to influence students to be more aware of both their need for a more supportive academic environment (based on self-determination), and how the current academic model did not seem to be providing it. However, the move from the Design Phase (Phase Two) to the Implementation Phase (Phase Three) highlighted barriers for both the students and professors. This final chapter presents the findings most relevant to the study's overall purpose, which was to explore the implications of the implementation of a TELE in a PETE program. The following sections present the findings specific to the research questions, the theoretical and practical implications, the limitations of the study, further research needed and a closing summary of the conclusions.

5.1 Findings Associated with the Design of the TELE

Self-Determination Theory (SDT) (Deci & Ryan, 1985) was used as a theoretical framework within this study. To recap, SDT is a theory of human motivation that provides a framework to examine the dynamic process between people and the environment (Deci & Ryan, 1985). According to SDT, teachers and administrators must not just design learning environments (e.g. TELEs) that support student learning and meet students' inherent psychological needs of autonomy, competence and relatedness (Ryan & Deci, 2000), but must also be aware of how social and cultural factors (e.g., organizational culture) could affect student willingness and motivation. SDT is a tested model that has previously been used to examine the influence of student motivation within a TELE. In this study, the participating professors designed the learning experiences within the TELE, understanding and attempting to infuse it with the principles of SDT (e.g. autonomy, competence and relatedness). To examine this theoretical framework in practice, the TELE was designed and implemented during a four-phase period and below are the most relevant findings related to SDT. Those findings were reviewed in conjunction with all the participants and the expert group in order to discuss and check the congruency of the researcher's interpretations about those findings.

Literature states that Self-Regulated learning (SRL) is an active, constructive process (Pintrich, 2000) by means of which students can regulate their own cognitive processes (Puustinen & Pulkkinen, 2001). SRL played a dual role in the design and implementation of the TELE for this study. First, SRL is a critical requirement for successful work in a TELE because students must be self-regulated to be successful as independent learners in a TELE (Bernacki et al., 2011). Traditionally, SRL is needed more in online settings due to the least restrictive elements found in classroom settings. For example, a face-to-face class will have set class times, and more opportunities to engage with the teacher and/or professor. Second, using the TELE could in turn support and promote the further development of those self-regulation skills (Bartolomé & Steffens, 2006). Using self-regulation learning (SRL) theory as a framework for the TELE design in this study was a priority, due to the previous research that illustrates the usability and positive outcomes of this framework. Pintrich´s self-regulation learning model (2000) was chosen because it is grounded in motivation and has been applied in research in real world educational contexts (Shunk, 2005).

The Moodle platform designed and implemented in this study used a Self-Regulated learning based reminder (called a 'schedule') to help students become accustomed to and learn about the self-regulation process. Using this schedule system, it was anticipated that students would be successful in developing and using the self-regulation process for themselves, both within and outside the TELE. Finally, both SDT and SRL theories have similarities in the importance they place on human motivation to engage in and complete tasks. This alignment meant that it makes sense to adopt a hybrid model drawing on both theories and present this study's results together and in so doing provide more robust answers to the research questions. Figure 21 shows the study's findings from a TELE designed under both SD and SRL theories.
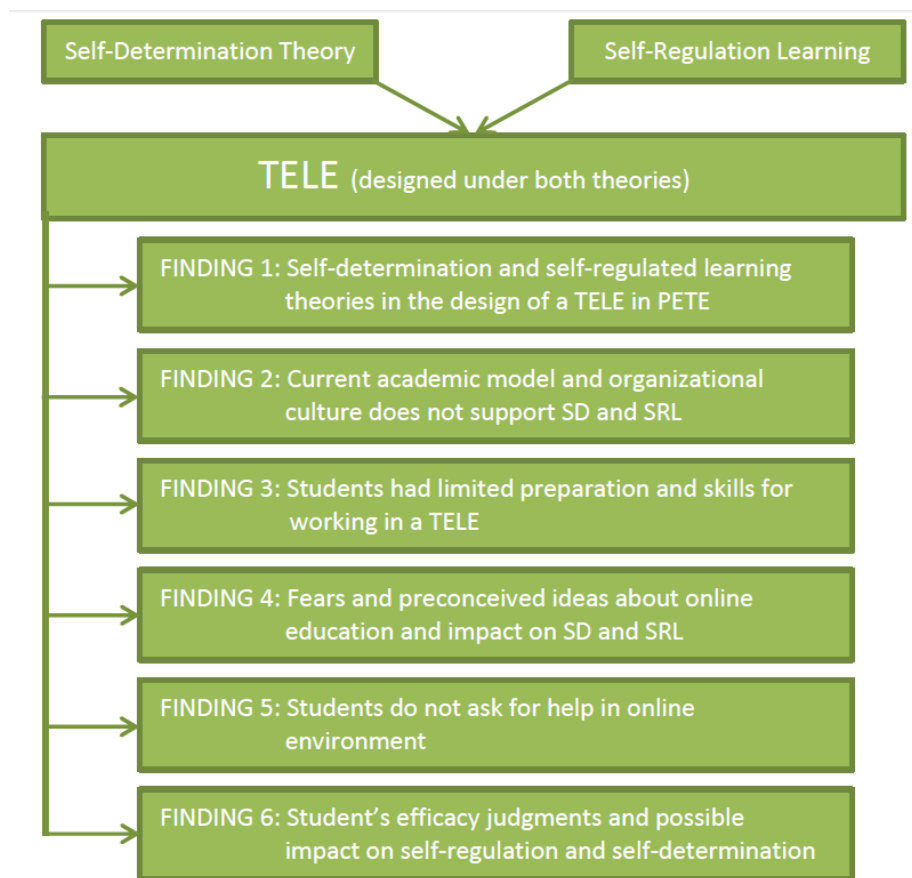
Figure 21: Study's findings from a TELE designed under both SD and SRL theories.

5.1.1 FINDING 1: Self-Determination and Self-Regulated learning Theories in the Design of a TELE in PETE

The TELE applied within this study, designed under the SDT and SRL theories, was developed in two parts, (a) theoretical part (e.g. create a text about teaching a movement) and practical part (e.g. create and present gymnastics exercises). The TELE seemed to support student's self-determined motivational responses (e.g. autonomy, competence, and relatedness) and Self-Regulated learning in different ways between the theoretical and practical sections of the class. During the theoretical part of the class, students stated that it was easier to be in charge or accommodate times for working on the task (i.e., exercising autonomy), and to manage or change a task if needed, according to their capacities (i.e., supporting competence). Students had shown an interest in and motivation for working with the TELE and using the schedule tool helped them to be aware that, even without being conscious about it, they had already been using some self-regulated skills in non-academic environments. This finding is consistent with research about the effectiveness of SDT in the design of TELEs (Bachman & Stewart, 2011; Somayeh & Takeshi, 2017) and TELEs as supporters of SRL (Dettori et al., 2005; Carreiro et al., 2011). The study also found that the predispositions of the participants were consistent with research findings that students from this Faculty believed in their own ability to complete tasks (e.g. self-efficacy) (Ornelas et al., 2012). It appears that the students who participated in this study had the prior experiences and capacities that supported them to be effective learners within an online learning environment, based on their self-efficacy reported in an online environment. However, even when SDT and SRL theories seems to be adequate to the design of a TELE in PETE, the technological design of the TELE and the unique characteristics of the students (e.g. lack of online experience) were factors that influenced the outcome and engagement of the students within the TELE.

After completing the implementation of the TELE (Phase Three) students showed interest and motivation about the TELE. That could be an indicator of the effectiveness of using SDT and SRL for designing a TELE in a PETE program. The TELE was designed to influence students' self-determined motivational responses by supporting both relatedness and competence. First, during Phase One students were asked to express their opinions about the TELE, and in Phase Two they were part of the TELE's design process which is something that the students expressed

as 'unusual' compared with the traditional classroom. That idea of being provided a voice and input is associated with relatedness, because students realize that their teachers care about their ideas and opinions (Niemiec & Ryan, 2009). Second, even when a student did not succeed within the TELE, they pointed out personal or external reasons and not the actual TELE program. As such, students felt like the TELE provided opportunities to succeed academically. For example, students highlighted the possibility of working at their own pace and being provided an enormous level of support to assist in accomplishing a task which could be viewed as supporting the need for competence. Jernigan (2004) suggested that students may not blame the course if they fail but can attribute their success and/or failure to their own lack of effort. This seems to be the case in this study.

During Phase Three of the study, students became aware of their lack of self-regulation skills in academic environments. Student interviews illustrated that self-regulation is not easy to achieve, and motivation was named as a main factor for successful application and understanding of the self-regulation process. They expressed their comfort in having the professor being in charge of the learning process and most of their regulation in the classroom. While students did prefer to work in a more controlled setting, there was some indication that autonomous motivation was adopted in non-academic settings, such as from their individual sporting activities. Of importance to this study, Legault and Inzlicht (2013) indicated that we still do not understand how to boost self-regulation from autonomous motivation. Those findings seem to be supported by research (Bernacki, Nokes-Malach and Aleven, 2013) showing that self-regulation for using a TELE, even for students with high self-regulated behaviours, is a dynamic and complex interplay of "learners' cognitions, motivations and behaviours" (p. 629).

Finally, students showed a motivation to work in the TELE using the SRL based tool (e.g., schedule). This is a good indicator for a possible success using SRL skills in a TELE because students must be motivated in order to adapt or use new SRL strategies (Deci & Flaste, 1996; Pintrich, 1999). Students also stated that the schedule tool was not only good to use it in the TELE itself but also in other classroom-based courses. This suggests that the schedule could be an effective tool to develop student's SRL skills because acts not just as a reminder of SRL skills which students may have used in other contexts. In addition, the use of the schedule tool may

155

benefit areas outside the online environments because its implementation could be as simple as a five-minute reflection about a task or homework.

5.1.2 FINDING 2: The Current Academic Model and Organizational Culture does not Support SD and SRL

Current academic model not supporting SD and SRL

The expert review of findings seemed clear that even though the University is using an academic model that on paper should support Self-Regulated learning yet in practice there seems to be some elements that are lost in the application. There are several possible explanations for that disconnection between the academic model and practice. First, the University made the change to a new academic model of competencies but did not make the necessary changes or modifications to the academic regulations. So, in practice, faculties could be still working with the program's evaluation requirements from the old model. This suggests that University may need to assist in facilitating the necessary programmatic changes to match and communicate their academic interests (e.g. using a SD and SRL supporting academic model) to professors and clarify staff expectations about how to work within the new model. To achieve that aim, change management literature (Todnem, 2005) also recommends to the organizations to:

a) Make it clear the common direction of any innovation process.

b) Communicating the change vision that they proposed.

c) Developing not just the vision, but the strategy to achieve that vision.

d) Monitor and adjust those strategies in response to any issue that could arise during the process.

Second, the capacity of each professor to develop and implement teaching practices using Self-Regulated learning was limited. Specifically, professors were still using old behaviorists' models for the educative process that could be viewed as controlling and limited the responsibility of the student. It is important to consider professors' limited knowledge of Self-Regulated learning strategies because, according to Zimmerman (1990), "when students often appear to lack both the will and skill to achieve academically, educators need instructional approaches that can offer direction and insight into the processes of Self-Regulated learning" (p. 14).

Third, even if professors engaged in professional learning about a new model (e.g. Self-Regulated learning strategies); there was evidence of cultural issues grounded in the University's academic model that limited the ability to put into practice the pedagogical principles espoused within this study. Joughin (2010) articulated the existence and need for explicit academic expectations in higher education for students and professors. In addition, there are implicit assumptions based in the context and students and professors' expectations that reflect the concept of the 'hidden curriculum' (McKimm, 2003). The hidden curriculum is not in the official program but must be learned in order to complete the studies and enable success for students. Professors' actions related to hidden curriculum can be made partly consciously and partly unconsciously (Bergenhenegouwen, 1987). From the 'hidden curriculum' perspective, professors could be changing the implementation of the academic model from the official program to the classroom, based on their personal assumptions and using methods for evaluation from the old academic model (e.g., monthly exams) instead of the new model's requirements for student evaluation (e.g., portfolio). This is supported by observations from professors who stated that the actual University's academic model could be misaligned because it aspires to self-regulation process (e.g., constructivism), but implements and evaluates using different pedagogies (e.g., behaviorism).

It is also important to consider the role of students' lack of awareness of Self-Regulated learning strategies within this context. This could be explained because students come from educative environments that do not typically support self-regulation. Mexico's educative system allows primary school students to pass from first to sixth grade by attending class and not as much through appropriate evaluation and/or student meeting specific benchmarks (DOF, 2013). An educative environment like this does not seem to support the development of students' self-regulation. This would mean that by the time students reach university they are not well prepared to be independent learners.

As such, the University's academic model seems to be not supporting or developing students' Self-Regulated learning skills or professors' capacity to support them. Any self-regulated processes that were evident in this study seemed to be more influenced by the students' reasons

for using the TELE. As discussed in Chapter 4, these reasons seem to be attributed to a lack of time to go to the university, having a job, or living far away from the university, rather than being influenced by the university's academic model or the personal and educative benefits from the TELE itself. From a change management's perspective (Kiefer, 2005) organizations must understand the specific reason why each component of the institution (e.g. professors, students, staff) resist the change. However, even when the specific reasons to fear change are detected, institutions must be aware that changing the mind state of the institution's people is not an overnight modification (Delaney & D'Agostino, 2015).

Organizational Culture not Supporting SD and SRL

Once Phase Three was conducted, a variety of contextual factors could be identified that influenced the overall educational experience of students. Organizational culture is important because according to self-determination theory (Deci & Ryan, 1985) "social and cultural factors (e.g., organizational culture) facilitate or undermine people's sense of volition and initiative, in addition to their well-being and the quality of their performance" (SDT, 2017 "Theory", para. 2). It should be noted that the context is complex and "only completely experienced by insiders" (Hofstede et al., 1990, p. 313), and that academic context should not be seen as a fixed entity as students can interact and improve it in order to learn (Zimmerman 1990).

In this study, the University academic context was a factor in enabling choice to work with a TELE because of the support for autonomous work and self-regulation (AUCh, 1998). However, the perceived common practices in the Faculty's educative context (i.e., organizational culture) that did not allow to students to work in a manner supportive of motivation (e.g., autonomy). For example, AUCh's students enrolled in online supported subjects are allowed to work at any time and any place with the help of a Moodle's platform. However, this faculty's students working on those online supported subjects (e.g., Technologies and Information Management) explained that they had to be physically at the time of classes even if they were going to work in the online platform (against the University academic rules for online supported subjects), otherwise they could fail the subject because of absences. Furthermore, in practice (as experienced in Phase Three), an online setting is dynamic and hard to control. The pedagogy required to teach effectively is different to the one from a classroom and professors did not have the experience

and/or expertise to guide to the students in this less structured environment. Also, students did not know how to handle being given an increased level of freedom and choice within their learning. Students were worried about the possibility of neglecting their work without their professor's supervision.

Taken together, these findings suggest that the organizational context of the Faculty of Physical Culture Science at the Autonomous University of Chihuahua is not yet ready to fully embrace TELEs because it is working under academic models not supporting SD or the SRL process. To change that the actual academic model must not just be reviewed and modified to support the SD and SRL process but must be accompanied for new academic regulations that support the professors' work in the classroom (e.g., evaluation by projects and not only by tests), a sound teacher training program both in SD and SRL skills and in the design of subjects with the aim of supporting SD and SRL. From a change management's perspective any training program must be prefaced by a solid process of planning and coordinating how all those changes must be not just implemented (Malek & Yazdanifard. 2012) but communicated to each component of the institution following with that the advice from both, the DBR methodology and change management literature (Allen, 2003) to including on any innovative process each component of the institution. Finally, organizational culture is, besides people, one of the most influential factors to change management specially working with Information Technologies (Mogogole & Jokonya, 2018).

5.1.3 FINDING 3: Students had Limited Preparation and Skills for Working in a TELE

While students showed interest, motivation and predisposition to work in the TELE, the students' need for autonomy and competence had not been supported during their previous academic life. As noted earlier, university students have at least 15 years (e.g., primary, secondary and high school) of academic work primarily based in environments tending to limit the support for and development of autonomy and competence. As such, those previous academic environments seemed to offer little support for self-regulation and self-determination. This is supported by findings from this study through comments from the students that teachers mostly do not give them the option to act with autonomy. Because of this, students would not have been provided choice and/or opportunities to be successful and develop self-determination

skills (Owens & Beckman, 2013). Without those self-determination skills, online environments can be more stressful for students due to the context and beliefs of individuals (Wehmeyer & Bolding, 1999; Loman, Vatland, Strickland-Cohen, Horner, & Walker, 2013). The previous academic model for this study's participating students may have been assumed to be supporting autonomy, but it in fact was not.

Since coming to university, the participating students had been working for at least one semester with an academic model that was focused on developing more autonomous, competent and self-regulated students. They had already passed one specific subject (Society and Culture) the previous semester in which they learned about the self-regulation process; a basic part of the UACH's academic model (UACH, 1998). This provided some preparation, even though this had not been delivered in online mode. However, this experience was likely to be not enough to facilitate and sustain meaningful change. This is supported by previous research whereby the Self-Regulated learning needs time to be taught and must be learned or adapted, especially when students are in new environments (Cleary & Zimmerman, 2004; Dabbagh, 2007).

The data collected in Phase One showed students' lack of understanding about the self-regulation process. Even more, once than they knew about self-regulation, they expressed doubts about their capacity to self-regulate; especially for those who had not been aware of having specific self-regulation strategies and skills of their own. That insecurity must be taken seriously by the institutions because, from change management literature, is a main component of people opposition or resistance to change (Grama & Todericiu, 2017). Those worries were later confirmed during student's participation in phases two (design) and three (implementation of the TELE) when first, they forgot to use the schedule and second, once using it, they forgot to follow the deadlines that they set for themselves; and finally, they did not use the TELE. All of that is important to be noted because they expressed feeling positive about working with at least some degree of self-regulation in the TELE environment, but then were not able to follow this through. Pintrich (2004) suggests that the four-phase self-regulation process of forethought, monitoring, control and reaction is not a linear sequence. In this study, it could be expected that the design of the TELE would encourage all four phases to occur somewhere, especially phases 2, 3 and 4.

The students in this study who were not successful in their use of the TELE did not show any kind of monitoring (e.g., monitoring time use) or control (e.g., change or renegotiate task) and seem to just react (e.g., evaluation of task) close to the final deadline. It seems as if these students moved only between Phase One (planning) and Phase Four (reaction), avoiding or at least minimizing the middle phases of monitoring and control. Particularly there was limited use of time management and help seeking, which are activities contained in phases 2 and 3 of Pintrich's model. On the other hand, the students who did finish the TELE, even when also having some trouble in remembering to submit the tasks, used the self-regulation tool (the schedule), and with that they received reminders days before the task deadline and were able to renegotiate a new deadline for that task or finish and send the task on time.

These differences suggest that the unsuccessful students seem to act similarly in the TELE as they would in the traditional classroom in that most of them left task monitoring and control to their professors. This tendency could be because they are not yet accustomed to working under a more self-regulated process. Further, even most of the professors in this study accepted that they were not designing their subjects in order to develop and support students' self-regulation skills. They said that they had not received the proper training to use strategies aiming to develop students' self-regulation. Proper training on the objectives or strategies to implement is an important aspect of change management ((Mogogole & Jokonya, 2018). According to this study findings, students demonstrated a lack of SRL skills to work in the following areas.

Lack of Time Management

The monitoring of time is one aspect of Pintrich's (2004) Phase Two that was identified as a factor in not completing the TELE and was consistent with some of the outcomes from the previous phases within this study. Both students and professors stated that time management was a possible issue when using a TELE. Students stated that they dedicated more time to the classroom-based tasks because they thought they could work later, at home on the online subject, most of students' work on the TELE was done in the last month of classes; however, most students found that they did not follow through. There is a relationship between time management skills and self-regulation whereby these strategies need to be supported by the

teacher and the teaching and learning strategies utilized (Terry & Doolittle, 2008; Kwan, 2010; Thomas, 2013).

Help-Seeking Behavior

Academic help-seeking behavior is an important self-regulatory strategy strongly associated with academic success (Payakachat, et. al., 2013). In the beginning of this study, students were asked to express their thoughts and ideas about help-seeking. Students said that help must be received only if it was required with autonomy by the student themselves; otherwise students could perceive unwanted help (i.e., supervision) as indicator of a professor's belief that the student could not finish a task on time by her/himself, and this in turn could affect student autonomy and engagement (Jang et al., 2010).

During the implementation of the TELE (Phase Three) students were able to ask for help if needed, but most did not seek assistance through the professor. At the end of the implementation, the students realized that maybe they needed to receive help from the professor of the subject, even if they did not really want to ask for it. Payakachat et. al. (2013) suggested that sometimes help-seeking behaviours can be viewed by the student as an admission of failure. This sentiment of admission of failure seems to align with this study and, because of this, students seemed to be more likely to fail a task rather than ask for help or clarification.

In addition, students in this study expressed the view that the faculty did not support them to self-regulate, even though the students felt they possessed high levels of self-efficacy (competence). Both self-efficacy and competence can impact on academic help-seeking behavior because this behavior can be related to students' perception of academic competence and faculty helpfulness (Payakachat, et. al., 2013). So it appears that despite reporting high self-efficacy for their studies, the students participating in this study did not perceive the teaching environment as supportive and so were less inclined to seek help.

Contextual Control

Pintrich's (2004) Self-Regulated learning model includes the possibility of changing the task context and/or renegotiating task to better meet the needs of each student – this is the notion of student exercising contextual control. In this study this could be related to students trying to adjust the context to eliminate or reduce distractions or trying to renegotiate task requirements. In this study, students demonstrated an initial understanding about the possibility of changing or renegotiating a task, but this was not acted on in later phases of the DBR process. For example, during Phase Two (design of the Moodle platform) students had the opportunity to modify aspects of the TELE in terms of the delivery and type of tasks. However, students chose not to change or modify anything. Furthermore, during Phase Three (Implementation) students were reluctant to change and/or provide feedback, even when they had been unsuccessful or failed a task. This lack of feedback and engagement in changing the tasks reinforces the idea that students did not use the self-regulation skills associated with monitoring and control in Pintrich's (2004) model. This suggests that even when students stated that they understood the possibility of change, they seemed not ready to assume the compromise that means to modify the official program and be somehow managers of their learning.

Coping with Failure

The students from this study who did not complete their work or send a task coped with that failure in two ways: (1) one withdrew from the school without contacting the professor and/or the researcher; or (2) some stayed enrolled in the subject but did not participate in the learning activities. Kadhiravan and Suresh (2008) define coping with failure as the tendency to deal with failure effectively. Skinner, Edge, Altman and Sherwood (2003) identified five possible categories for coping with failure: positive cognitive restructuring, problem solving, seeking support, distraction, and escape/avoidance. In this study, the students who did not finish the TELE seemed to deal with failure in ineffective way and their actions could be defined as escape/avoidance. Students who adopt this approach are "disengaging cognitively or behaviorally from the stressful experience" (Allen & Leary, 2010, p. 113) and do not persist or seek help when faced with a challenge.

Self-Regulation Skills Utilized by Students

While some self-regulation skills were underutilized, students did demonstrate the use of specific principles. For example, the schedule tool was designed to help students with the processes of identifying the difficulty of the task and encouraged some self-regulation strategies such as: target goal setting, prior content knowledge activation, efficacy judgments, time and effort planning, perceptions of task difficulty and need for help. In Phase Three (Implementation and testing of design in practice) students needed to take charge of their educational process. This Phase Three provided students with a scaffold for Self-Regulated learning, which was supported through using the schedule. During activity one in the Moodle platform, students had to complete the schedule before having the opportunity to submit the completed task. However, through the next activities, when students were provided more independence, only the students who passed the subject applied the strategy of completing the schedule in practice. This suggests that since students reported having utilized self-regulation skills in non-academic environments, the use of a helping SR tool, as the schedule, seemed to allow them to bring and apply those SR skills from a non-academic to an academic environment.

5.1.4 FINDING 4: Fears and Preconceived Ideas about Online Education and Impact on SD and SRL

Both professors and students held preconceived ideas or assumptions (i.e., paradigms) about how online education could affect student learning. For example, concerns were raised that relatedness seemed to be not supported in a TELE as students felt the need for face-to-face interaction with their professors; and because face-to-face instruction can provide social connections because in face-to-face conversations "more than half of the communication is non-verbal" and in "each conversation only seven percent of the concepts are expressed in the form of spoken words" (Bambaeeroo & Shokrpour, 2017, p. 53), participants considered that an online environment does not allow for the level of non-verbal interactions that is common in a classroom setting.

Concerns about competences focused on the need for the teacher to facilitate and guide learning and provide an optimal level of educational challenge. An online setting may not lend itself to

allowing the teacher to guide learning as there can be a lack of information gathered by the teacher to influence and guide the students toward success. Without the teachers' guidance, competency can be affected if students fail and feel that their failure is just because they are not capable; instead of recognizing that they need professors' guidance and supportive feedback for feeling competent and capable, especially on this new online setting (Harnett, 2016).

Price and Kirkwood (2014) argued that sometimes the use and evaluation of technology in education can be based on beliefs and assumptions. That was confirmed for this study when after the participants received all the information about what a TELE is and how to use it in a PETE, their negative preconceived ideas about online learning changed to positive ideas. This suggests that participants developed an understanding that online interaction could be successful in a TELE and they became more involved.

Issues of competence and relatedness are also linked to instances of academic dishonesty. Niemiec and Ryan (2009) stated that if students feel able to meet the challenges of their schoolwork, they are competent. In addition, a student's feeling that the teacher likes, respects and values him/her is associated with relatedness. In this study, both professors and students were concerned that academic dishonesty (e.g., asking and allowing to peers to do the online assignments) could be an issue in the online subject. During the TELE's use, professors worried about academic dishonesty, which was confirmed when some students lied about sending completed tasks and about how much they engaged with the TELE. From this viewpoint, any academic dishonesty from a student with the goal of taking academic advantage could suggest that: (a) he/she does not feel able to meet the academic challenges and/or (b) honest interactions between student and teacher are not supported by an enough perceived level of mutual care and value of the individual. With academic dishonesty becoming a major issue within online environments (Timothy & Melissa 2013; Corrigan-Gibbs, Gupta, Northcutt, Cutrell & Thies, 2015; Azulay Chertok, Barnes & Gilleland, 2014), issues of competence and relatedness need to be considered carefully.

Little (1997) found that for formal educative contexts learners do not automatically accept responsibility for their learning. Independent learning seems to be a new experience for this

study's participating students, particularly after all the previous years of non-autonomous academic environments. Congruent with that, the students in this study expressed fears about making a commitment to being independent learners. Other researchers have identified this as a challenge in higher education and support the need for improved students' independent learning skills, especially in the first year of Higher Education (Field, Duffy & Huggins, 2014).

At the same time, professors seemed to be attached to a non-autonomous style of teaching rather than change to a more autonomous environment in a TELE, suggesting that supporting independent learning could be a difficult and complex task for them. According to Balcikanli (2010), "it is unrealistic to expect teachers to develop a sense of autonomy unless they have themselves experienced teacher training where an exploratory and evaluative approach to learning and teaching have been key elements" (p. 91).

In order to be successful independent learners, participants need to be competent and show explicit commitment about using self-regulatory processes (Dettori et al., 2005). This is an important consideration because some students in this study expressed some fear to commitment to a more autonomous, self-regulated process. Further, even successful students must adapt or activate new SRL strategies in response to negative outcomes and different tasks or environment (e.g. online) (Cleary & Zimmerman, 2004). This suggests that while some of the fears of students and professors were addressed in the initial stages, some continued and were realized in the implementation of the TELE. Closer attention to the need for relatedness and competence may be helpful.

5.1.5 FINDING 5: Students do not Ask for Help in Online Environment

One important point about students in general is asking for help. Most of the students in this study showed a reluctance to ask for help because they felt it was an extra pressure, when actually asking for help is a positive characteristic related to high levels of self-efficacy (Ryan et al., 1998) and avoiding help is associated with poor learning outcomes Roll, Baker, Aleven & Koedinger (2015). Other research has found that for online environments overusing help could be seen as negative because it is associated with lower learning, and sometimes can have little effect on learning (Roll et al., 2015). It may be that since students are in a new learning

environment (online) which is not supported by the professors, that they do not know what or how to ask for help.

In this study, I tried to address this possible issue by asking students twice to choose how frequently and how they would like to be supported for each task in the new online environment. The first time was during Phase Two (design) when students could set fixed times to receive help (e.g., one week before each task deadline). The second time was during Phase Three (implementation) when students used a schedule to specify what kind of ways, they thought would be better for support (email, telephone, chat group, etc.) and how frequently they would like that support (e.g., one week or days before the task dateline). However, during Phase Two (design) the students indicated that they did not want to receive help or reminders about the tasks, saying that they felt it would be like the "rules from the classroom" and add extra pressure on them. This idea is supported by research from Daniels and Bizar (1998) who found that some elements of the classroom structure (i.e., rules) could interfere when the class' autonomy.

And then, during Phase Three (implementation), most students did not use the schedule and even the ones who worked in the Moodle platform forgot during the first task to send the schedule before the deadlines. It was during Phase Three (implementation) that the students started to show problems with their self-determined motivational responses (i.e. needs support and self-determination) and there was a clear distinction between the students who asked for help and those who did not. From three students who asked for help at some point of the project, two finished and passed the TELE. That is congruent with literature in that knowing when and who ask for help is not a sign of weakness, but of self-regulation (Ryan et al., 1998). Also, students with higher motivation (e.g., the ones who finished the course) felt and showed confidence about their competence levels, did not care about asking for help and even praised the professors' reminders as motivational. At the same time, the students who found the help prompts added extra pressure were the ones who did not finish the course.

Finally, after the review of the findings in Phase Four, all the participants, even the ones who finished the program successfully, changed their minds and finally suggested the need to be reminded or supported during the process, even though at the beginning they felt able to do it for

themselves. This is in accordance with the literature which advises on the need to design effective autonomy support and structure to engage students in learning activities (Jang et al., 2010). From the beginning for the present TELE, the Faculty and instructional designers considered how to embed features in instructional materials to encourage learners' self-regulation (e.g., based on Harris et al., 2010). We ask for some form of automatic prompt that would prompt students to ask for help, but because of technical issues the main designers in the CECAD could not add it to the final platform. As an enhancement for the next TELE, there could be structured help and support during the learning process. This, however, but must be designed to not be invasive or adding pressure to students, especially if they believe that they do not need it. This could be hard to do because as research states, "while both autonomy support and structure make important contributions to supporting students' classroom engagement, the nature of the relation between them has been portrayed rather confusingly in the literature" (Jang et al., 2010, p. 588).

A further reflection is that this study revealed that the participating students had previously experienced educative models that did not support autonomy or relatedness and this may be a factor in them not asking for help even when they needed it. This suggests that the design of any TELE must consider the experiences of the participating students when building in supports that encourage help seeking.

5.1.6 FINDING 6: Student's Efficacy Judgments and Possible Impact on Self-Regulation and Self-Determination

Self-efficacy (SE)is identified as a condition for self-regulation (Zimmerman, 1990) and research from Sweet, Fortier, Strachan, Blanchard and Boulay (2014) shows that a theoretical integration between self-determination and self-efficacy theories is feasible since both seem to support each other, at least partially. In research conducted in the Faculty which was the context for this study, Ornelas et al. (2012) showed than the students rated themselves as self-efficacious for indicators of academic behavior (e.g., communication, attention and excellence). From those results it could be expected that these students have some predisposition to self-regulate and in Phase One (analysis) of this study the questionnaire results suggest this: with 33 students (50%) expressing themselves as self-efficacious for successful use of the TELE. However, in the next Phases Two

and Three when facing the real possibility of using the TELE, only 12 students volunteered to be part of the study and only 2 of those finished the subject successfully. If they considered themselves as self-efficacious and this is a condition to self-regulation, why then did such a low percentage of students try to use a self-regulation supporting system?

A possible explanation for that could be the context. Even when students were not able to self-regulate their learning in the TELE, during Phase One interviews they were able to recognize aspects of Self-Regulated learning in other, non-academic contexts, as in their activities with the Faculty's sports clubs. From that, they seem to have some Self-Regulated learning skills and be using them at least partially, perhaps even in an unconscious way, but in different contexts than school. That is congruent with Zimmerman (1990) who suggests that the context affects the level of perceived self-efficacy.

Another possibility could be that students overrated their self-efficacy. In Ornelas et al. (2012) students were asked whether they felt self-efficacious to do a given task, but only from a theoretical point of view; they were never asked to do that specific task. In the questionnaire from the Phase One of the present study, 65 students were asked about self-efficacy in a theoretical task (e.g., the possibility of working in a TELE) and 33 (50%) agreed they could do it. Then in Phase Three they were asked to apply that self-efficacy in the same practical task (e.g., working in the TELE). Only 3 of 33 (9%) engaged in working in the TELE, which means 90% of the students (30) who thought of themselves as self-efficacious had a possible mismatch between their theoretical and practical self-efficacy beliefs.

It may be that they were asked to express levels of self-efficacy about a task (e.g., online education) that they had never done before and that could be a factor to overrating their self-efficacy. For Zimmerman (1990) it is necessary to have the experience of previous work in a specific task to develop a suitable perception about one's own capacity to take on a similar task. Also, sometimes the perception of a very good reward for using an educative system or environment could be a factor in overvalued students' self-efficacy levels and could affect students' motivation (Wex, 1997; Jernigan, 2004). In this study, the students who volunteered may have wanted to take the TELE to have more time for themselves (because of its flexible

design) or because it allowed them to re-take a failed subject in quicker time than normal. Both of these could have seemed like good rewards and caused students to overrate their ability to complete the TELE. Finally, since "Self-Regulated learning is interrelated with self-efficacy" (Pintrich & Groot, 1990, p. 37), participants who overrated their real capacity to work in the TELE may have also overrated their ability to work in a self-regulated way, and then in the end could not finish it.

All of this is important because for the students who expressed a readiness to engage in the TELE went on to fail the tasks, could be discouraged from continuing with the next tasks. This is because "realistic expectations about one's own ability (e.g., self-efficacy) play an important role in starting and continuing tasks" (Wen, 1997). Those students who are overrating their self-efficacy, based not on realistic expectations but because of the possible rewards, could become de-motivated. This was shown to be the case in a study of language students (Jernigan, 2004). This is problematic for teachers and designers because motivation is a basis for self-regulation (Zimmerman, 1990).

Consequently, the self-efficacy levels for this study and previous research from Ornelas et al. (2012) seem not to be totally valid in predicting outcomes (e.g., successful use of a TELE.) These observations align with research showing that self-efficacy does not necessarily predict actual outcomes for tasks that are not well understood and reflects debate about how self-efficacy can be assessed (Pajares in Maher & Pintrich, 1997). These findings suggest that no educative system should be implemented in practice based solely in students' self-efficacy levels because even if someone feels able to self-regulate it does not mean they are actually ready to. Self-Regulated learning must be learned, worked on and developed over time (Zimmerman, 1990).

5.2 Further Reflections on the Context and Organizational Culture

From the first interviews and until the last phases of the study, one factor stands out as significant: The Faculty's organizational culture and the implications to the application of the TELE. All the outcomes related to this factor were grouped in the research question three: *How does the organizational culture affect the effective design and application of a TELE?*

Two of the most important outcomes related to organizational culture and use of a TELE in this Faculty were: 1) that professors and students had 'never heard about self-regulation' even when the Faculty was working in an educative environment that supposedly promotes self-regulation; and 2) this meant that the Faculty had been designing educative programs that conflict with the University's academic model. Those two aspects are highly significant because the Faculty's organizational culture had important implications for the successful application of the TELE. It raises questions about whether a TELE could work effectively in an educative environment with such contradictions.

In considering this question it is important to note that, first, the TELE was selected as a feasible system to be used in the Faculty because of the University's academic model that promotes self-regulation and autonomy. These are both important factors for the effective design and application of learning environments (Ryan & Deci, 2000), and apply to TELEs.

Second, even when the actual academic model is promoting, at least on paper, the importance of self-regulation and autonomy, and with that the possibility of using educative systems supported by those factors (e.g., TELEs), the real-world organizational culture seems to not support the correct application of the University's Academic Model. Literature shows that time is needed for the successful implementation of online education (Van de Vorg & Pogue, 2012), even in contexts already supportive of autonomy. So, it may be that this Faculty was not ready for this implementation. As such, the results of this study could help to guide the Faculty's future efforts towards that goal.

Finally, one important point from the beginning of the study was that all the participants expressed some personal concerns about impediments to using a TELE in a PETE. For example, some felt there is a need for face to face interaction and considered it impossible to evaluate physical education in a TELE. Even when in the end all those ideas seemed to be paradigms (e.g., assumptions with no solid information to back up them) this is a point that needs to be carefully considered. Price & Kirkwood (2014) point out that the use and evaluation of technology in education can be based only beliefs and assumptions, without proper theoretical or empirical foundations. Also, Guba and Lincoln (1994) stated that "a paradigm may be viewed as

a set of basic beliefs that must be accepted" and "there is no way to establish their ultimate truthfulness" (p. 107). In this study, participants' negative ideas changed became positive after working through Phase Two (Design) when they received information about TELEs and how they could be applied in PETE. This showed something of a paradigm shift. But it might be that this was not enough to challenge perceptions.

This raises questions about whether the Faculty can support students' basic needs for successfully working in a TELE. The TELE model used in this study was based in part on self-determination theory (SDT). Basically, SDT states that if the context (in this case the Faculty) supports students' three basic needs (autonomy, competence and relatedness) they can be motivated to act, and from that, can feel ready to self-regulate (Deci & Ryan, 1985). In this study two of those needs, competence and relatedness, seems to be well supported; allowing to the students to work in their own rhythm and submit tasks when they were ready (competence) and with professors taking care of what students said and felt about the subject (relatedness). And the academic model, at least on paper, was 'autonomy supporting'. That was one important aspect for choosing SDT as the basis for using a TELE in this specific Faculty. So, with the design of the TELE in this context, there was a good chance it would be successful.

However, after all the work with professors and students it is apparent that in this Faculty, the academic model is not actually 'autonomy supporting'. This is problematic because, according to SDT, "contexts that support versus thwart these needs should invariantly impact wellness" (SDT, 2016, "Theory", para. 5), thus all three needs are essential. If any is thwarted there will be "distinct functional costs" (SDT, 2016, "Theory", para. 5). Without real support for autonomy, the students participating in this study were without support for one of their basic needs.

This conclusion was supported by the experts in Phase Four who stated that the University's academic model is not really autonomous and actually could be wrong from a theoretical conception because it proposes constructivist approaches but asks for evidence via traditional behaviorist performance (e.g., tests). One main reason for this could be that even when the academic model changed in 1998 toward a more autonomous model, the University's general regulations (e.g., how to evaluate and fixed semester times) remained the same as those used in

the old behaviorist model. The experts participating in this study suggested the need for changes in the University's regulations to reflect the Academic Model, or even further changes to migrate to a new and truly constructivist model.

The need for autonomy (e.g., urge to be the causal agent of one's life and educative process) in this Faculty seems to be compromised. The students in this study felt unsure about acting with autonomy and taking control of their own educative process, and because of this expressed worries about forgetting to do the tasks by themselves. This lack of confidence to take control comes from years of working not only under the teacher/professor's guidance but leaving most of the regulation of the class to him or her. This approach comes from studying under a school system that does not support students to be independent learners and take responsibility for their learning, from passing through the primary grades without assessment, to coming into the University without a sound admission test.

In sum, for the students participating in this study, the lack of support for autonomy is reflected in the rest of the subjects they are studying and the approach of the professors who are not trained to be autonomy supporting. In non-autonomous environments like this one, at least one basic component of the SDT will be missing and because of that motivation will be compromised. Since motivation is a basic part of Self-regulation, Self-Regulated learning is not fully supported. And since using a TELE depends on motivation and Self-Regulated learning skills, using a TELE in this context That could be an indicator of the effectiveness will be also compromised, along with any wider benefits from using the TELE. It seems that is not a matter of what tool, TELE or any other educative system is used, until this Faculty makes changes in their context (organizational culture) to be more autonomous and support students' Self-regulation, any technological tool or other innovative educative system cannot be successfully implemented.

5.3 Implications for Applying SRL and SD Theory

This section considered the implications of student and professor experiences for the design of technology enhanced learning environments for Physical Education Teacher Education, particularly using self-determination theory and Self-Regulated learning theory.

The theoretical model for an online subject based on SDT and SRL seems to work, from what professors and students said, at least in a theoretical way. Both professors and students expressed than the theoretical design of the project was feasible. Most of the professors (86%) and at least half of the students (50%) from the initial questionnaire considered the real possibility of using a TELE. This lends support to suggestions from other research that SDT and SRL are appropriate frameworks for designing and implementing a TELE (e.g. Dettori & Persico, 2010; Chen & Jang, 2010). However, the ten (10) student participants in this study seemed unable to engage fully with the TELE in practice. Even so, all reported feeling motivated enough to use the TELE; and the two participants who did truly engage, did show some self-regulated behaviours and completed and passed. This suggests that students are motivated enough about the TELE and maybe they need to experience SRL and SD theory in all their classes (classroom and online) and not just in the online settings in order to develop the needed SRL and SD skills.

The general ideas students from this Faculty had about learning in online environments (based on the questionnaire responses) are similar to what literature states about students not taking online courses or preferring face-to-face instruction at least for practical activities (Shi et al., 2011; Kemp, Grieve, 2014). In this study, 63% of students reported that they would not choose to use the online subject. That was mostly because of their personal beliefs about how physical education must be taught with face to face student-professor interaction, students must present evaluation in person instead of online or video, and that the professor still acts as an irreplaceable part of the process. All those cultural factors are expressed in a student's need for constant supervision and someone other than them to be in charge of the regulation of their cognitive process, affecting their SRL processes and not allowing them to learn to be self-regulated (Zimmerman, 2002); and undermining their sense of volition and initiative (SDT, 2016).

In the end, these ideas seem to come from a lack of information about online education, because most of their negative ideas changed when they have a chance to test the preliminary Moodle platform in Phase Two. After that, most of the participants agreed that it seemed feasible to use a TELE in a PETE program. This suggests that it may be not just be a matter of whether new theories (SDT and SRL) can be successfully implemented in a PETE but first, how to change old

174

beliefs of professors, students and staff that seems to do not allow for those theories to be implemented.

In summary, while SRL and SD theories seem to be useful for creating an online educative environment, as reported in literature (Cheng & Jang, 2010; Johnson & Davies, 2014; Triquet, Peeters & Lombaerts, 2017), it is challenging for professors and students without skills or experience in the use of SRL and SD to succeed in such an environment. This was demonstrated clearly in this specific environment where there were aspects in organizational culture that did not align with these theories and the established working habits and past experiences of the participants (both professors and students) did not prepare them to work online for the first time. To be effective, educative programs must take into account the dispositions of the participants to engage in the process, the nature of the context they are in and follow the suggestions from both SRL and SD theories about how to develop the skills needed to work in online educative environments.

5.4 Practical Implications for Implementing a TELE

One of this study's aims was to understand how professors and students experience teaching and learning respectively in a TELE designed for Physical Education Teacher Education. This section considers some practical implications for implementing a TELE.

Students demonstrated a change before and after using the preliminary version of the platform with a particular change associated with the possibilities of learning when using a TELE. Before using the TELE, students could not imagine a PETE program online, particularly because of the lack of face to face interaction. After working with the platform they expressed a better appreciation of the possibilities, for example for how video could support practical classes and how examples from around the world would become available to them. This shows that having an early experience can change negative views about online learning to be more positive.

Students felt unsure of having the necessary skills to work in more autonomous environments and make academic progress. They expressed *fear of commitment* about using a TELE. This is a factor to consider because contrary to other negative factors that could decrease after using the

175

TELE, fear to commit may grow after students engage with the TELE, especially if they were not successful. This fear of commitment is understandable because using a TELE requires extra time and effort to stay focused on the academic tasks, even if there are problems (Maddi & Khoshaba, 2005; Ramsey and Lorenz, 2016). Unless students learn how to identify and manage this fear of commitment, that will limit their capacity to engage as independent learners not only in a TELE, but in the actual classroom, and they will not achieve a basic aim of the UACH's academic model: to be "self-advocates for their own learning" (UACH, 1998, "Modelo Educativo UACH", para. 13).

Like students, professors expressed hesitation about having the needed skills to work in autonomous environments. From interviews conducted in Phase One and after the final work with the TELE (Phase Three, Implementation) professors demonstrated a lack of understanding about strategies for teaching in more autonomous environments, not just online but in the classroom. Furthermore, professors were using traditional autonomy supporting models for the educative process, and even when expressing a need for training to help them redesign their programs were still concerned with 'forcing' students to work. This suggests that training professors about self-regulation strategies for teaching is important, but must be accompanied with work to change their general ideas about teaching.

These points were supported by the findings from the expert review in Phase Four. The experts in teacher training indicated that a recurrent problem in all the training courses is that there is a lot of theoretical talk about the academic model, but a lack of specific strategies for applying the model with students. This could be an issue because according with Zimmerman (1990) students often needs instructional support because of either a lack of academic skills or a lack of will to continue with the process of self-regulation. In this point, professors need to be able to bring support and guidance through specific instructional approaches, which apparently, they do not have. This suggests that specific training is needed to help professors understand what they can do to facilitate and develop students as self-regulated learners.

The design-based research methodology used in this study asks for the collaboration between practitioners in the design. As noted by Reeves, Herrington and Oliver (2004) design

collaboration can raise issues because participants are not used to working together. In this study, students and professors commented that it was unusual to be working together on the design of a subject. Even though they were part of the design process, the students and professors did not ask for major changes to the platform's first version. From that we can assume that either the TELE was good enough to them or the students' lack of experience designing subjects and the professors' lack of experience in more autonomous environments could have been a barrier to allow them to understand what was possible and effective. However, it must be noted that although the collaboration between students and professors was done jointly as part of the TELE design process, it was not done at the same time. First, students worked alone with the researcher on the Moodle platform and after that professors worked with the researcher. Maybe that style of working made difficult for DBR participants to make decisions and assume responsibility for decisions that are implemented (e.g., Dabbagh, 2007). A recommendation for future joint work on the design process could be to bring both students and professors, to work together in an official academic environment such as the bi-annual academies, where both groups could receive basic training about design of online academic environments This would help them to develop a deeper understanding of the design process for an online subject and with that be able to make decisions about it.

Finally, in Phases One and Two, professors stated that it may not be possible to work in a self-regulated way in the first semester of the bachelor degree. That process could be too new for students coming from years of non-autonomous academic environments. It has been suggested that it can be difficult for such students to quickly adapt to the change and automatically accept responsibility for their learning, particularly on the first year of a totally new academic stage as an undergraduate university student (Little, 1997). This seems to be further supported by students' low engagement during Phase Three (Implementation). Professors also suggested using TELEs in more theoretical and non-practical subjects (e.g., philosophy) during the first semesters in order to give students the required time to be taught and develop how to work in a self-regulated way (e.g., Pintrich, 1999; Zimmerman, 2002; Harris et al., 2010; Dabbagh, 2007). In order to cover those first semesters' requirements of work in a self-regulated way, the four Basic University subjects already in a blended learning mode (in-person and online components) could

be redesigned as students' first official experience with more autonomous and self-regulated academic environments.

To sum up, both students and professors need support and time adapt to an academic model based on a more autonomous approach both in the traditional classroom and in a TELE before students can be expected to be successful independent learners.

5.5 Limitations

Even when all the steps required for a case study methodology (Stoecker, 1991) and design-based research (Herrington, et. al., 2007) are followed, the particular nature of any study presents limitations that must be acknowledged. The following are the main limitations of the present study:

1) Researcher bias: In qualitative studies, the researcher is working directly with the subjects as the principal collector of the data (Merriman, 2002). While this provides the possibility to examine data and participants in depth, we must consider the researcher's bias. For me as a researcher, I acknowledge that my desire to discover data that supports my own point of view about that study may have influenced me put more attention to the data that interested me, but on the other hand I tried not to dismiss the data that seemed not to support my beliefs. As discussed elsewhere in the thesis, I outline my own background and added measures (e.g., the expert group) to support high quality analysis.

2) Generalization: A low number of participants allow a more in-depth understanding of the research problem but care must be taken with generalization of the findings to any other than that specific context. This study was conducted in a Faculty of Physical Education, a very specific area in education, from that taking generalization outside this specific area could be difficult. Even more, the organizational culture of this specific faculty limits the conclusions could be taken outside to other Faculties, even in the same area of Physical Education. Also, the Mexican educative model affects students in a specific way, particularly in limiting their experiences of Self-Regulated learning and self-determination, meaning that generalization to other countries with different educational systems could be very difficult.

3) Time: DBR is iterative and typically conducted using multiples cycles of work, whereas this study was constrained to the relatively short amount of time aligned with the completion of a PhD. The application of multiple cycles (3 or more) could have increased the potential benefit of using this form of research design because it would have allowed participants more time to work together and be prepared for this type of learning. This may have made the TELE more successful because some of the barriers identified in this study might have been able to be addressed. As soon as I finished the PhD process, I will be able to apply new iterations.

4) Technical limitations: Even when the research team and participants had a clear idea about what needed to be done within the online system and the interactions with the students (e.g., prompts messages and video upload), the technical systems of the online environment at this particular University created some limitations. Specifically, it was not possible to implement some of the suggested features, such as the schedule tool, due to the technical limitations and capacity of the universities online system. Through consultation with the Expert Group it was decided that the best course of action to allow for the implementation of a scheduling tool using the Moodle capacity was to create this in a Word document.

5.6 Further Research

This study results supports the need for future research in the following general topics.
1) Factors for the Successful Application of a TELE

Even when most of the factors needed in order to design and use a TELE were addressed by the theoretical approach and the practical tools, and the Faculty was working under an autonomy supporting academic model, some "hidden" factors in the organizational culture of the Faculty were not supportive of a TELE. Those hidden factors must be researched in order to not just design and apply a TELE, but to enhance the traditional classroom. Research must be conducted across multiple contexts into:

- How a faculty context can support students' basic autonomy needs for successfully work in a TELE.
- How previous academic experiences (e.g., high school) can support student autonomy.

- How can this Faculty can work with high schools to develop more autonomous students before they come to the University.
- How findings can be generalized to other faculties, disciplines and universities.
- How online education can balance structure, autonomy support and control.
- How students' self-reported self-efficacy for online education relates to real performance.
- How our Faculty (professors, students and administrative) could be able to work together without the traditional roles and hierarchy lines of professors and student.

2) Research Specific to Physical Education Teacher Education

Online education is very new in Physical Education Teacher Education in Mexico, and elsewhere. This study highlighted some of the assumptions about why TELEs might not be successful. But more research is needed to uncover and understand those ways of thinking. From that research could be conducted into:

- Paradigms from students, professors and staff for using online education in PETE, in Mexico and other countries
- Pedagogies for the virtual physical culture (including methodologies and didactics for virtual physical culture, sports and adapted sports in virtual physical culture online environments).
- Effective technological support for PETE subjects already in blended modality.
- Evaluation of online Physical Education Teacher Education programs.

The president of the Mexican Council for the Accreditation of the Teaching of the Culture of Physical Activity (COMACAF), was part of this study's expert group and expressed the urgent necessity to develop evaluation protocols not just for any new PETE online program, but for the actual PETE programs that wanted to implement totally online subjects or partially online supported in the blended modality; since as for today COMACAF do not had an evaluation protocol for those situations.

3) Research Specific to Socially Shared Regulation mechanism

Socially shared regulation of learning (SSRL) is a new field to be worked and supported in the Self-Regulated Learning Theory (Panadero & Järvelä, 2015; Zheng & Huang, 2017). Understanding how that process is regulated inside a group is an area to be researched. For that, and even when SSRL was not the main focus of this study, that process must be worked on future researcher not just on this specific educative environment (e.g., online PETE) but in the whole educative environments that conform the AUCh.

5.7 Conclusion Summary

The study presented in thesis followed a design-based research methodology organized in four phases: Analysis, Design, Implementation and Reflection. The outcomes of each phases helped to answer the study's three research questions and address this study's purpose to understand the experience of a TELE in a Physical Education teacher education program. The following paragraphs briefly summaries the key findings for each question.

1) Question One: How can self-determination theory and Self-Regulated learning be applied to design an effective Technology Enhanced Learning Environment (TELE) in Physical Education Teacher Education (PETE)?

The findings from this study seem to support the effectiveness of using SDT and SRL for designing a TELE in a PETE program, even more so when students present SD and SRL skills even when not in academic environments. From the initial group two students (students 2 and 4) progressed to the point of actually teaching the movement to a child, and both received the approve grade from the professor. Student 4 did not meet in person with the professor, and so his experience demonstrates the possibility of using a TELE and PETE to achieve flexibility through technology-enhanced communication.

However, the reality of their application, demonstrates the complex process to reach not only a functional design for a TELE in this academic environment, but an effective application. To achieve that, SDT and SRL must be applied and evaluated as a regular part of the classroom activities within the Faculty so that they are well developed in students and well understood by professors. Only then, might the Faculty be able to move on to develop effective TELEs.

2) Question Two: How do students, professors and university staff engage with a TELE in PETE?

At first students, professors and staff expressed positive views that using a TELE in PETE could be beneficial, even though they were not accustomed to online education. However, that was only in Phase One (Analysis) and Phase Two (Design). After that, in Phase Three (Implementation) many factors prevented them from engaging with a TELE. Students and

professors not only showed a lack of understanding about aspects of self-determination and Self-Regulated learning, even when they had supposedly been working within an academic model that supports autonomy. This was reflected in the implementation phase when most students did not ask for help when using the TELE, showed a lack of time management, expressed a fear of commitment to Self-Regulated learning, and some incurred a kind of academic dishonesty by lying to their professors. These were examples of how students did not take responsibility for their own learning. As for professors, and according to they own expectations from Phase One, changing the strong background of professor-guided teaching was difficult and professors even expected students to struggle when trying the TELE, which is what happened in practice and had been remarked on by professors during and after Phase Three. Finally, from the start of the study Faculty staff showed a negative disposition to the TELE. After Phase Three, when commenting how professors and students are so accustomed to classroom and face-to face activities, they remarked that maybe classes are being the only way to teach in a PETE. Overall, students, professors and staff did engage with a TELE in PETE in a very limited way.

3) Question three: How does the organizational culture affect the effective design and application of a TELE?

Even though this faculty was working according to an educative environment promoting Self-regulation, a basic factor for using a TELE, the study identified some key barriers. Both professors and students were unfamiliar with Self-Regulated learning; professors had been designing educative programs that conflicted with the University's Self-regulation supporting academic model and all participants had preconceived ideas about TELEs that were an impediment for the final application of the TELE. This study reveals how organizational culture may impact in the way to design and apply TELEs, and not just in this Physical Education Faculty, but in higher education in general.

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Appendices

Appendix 1: PROFESSORS' QUESTIONNAIRE FOR THOUGHTS ABOUT ONLINE

EDUCATION IN A PETE (ENGLISH VERSION).

This survey is part of a study of Internet use in Physical Education and is part of a PhD project. The survey is designed for staff from the Faculty of Physical Culture Sciences and aims understand staff feelings about using the Internet in class.

We would appreciate your honesty in your responses to gain an understanding of your thinking about online education in the area of Physical Education.

By completing this questionnaire you are consenting to us collecting this data from you.

Select the desired option. We would appreciate your comments in the questions that require you to enter your opinion. Thank you.

Age (   ) Gender M ( ) F ( )   Grade (LEF, acounter, etc.)_____

1. - Define online o virtual education.

2. - Which of the following technologies has used?

Lap top ( ) PC ( ) tablet ( ) Social networks (   ) ¿Otra?_____

3.- With regard to class work with their students:
What does autonomy mean to you?
How do you promote it in your class?
What does self-regulation mean to you?
How do you promote it in your class?
4. Select as many options as desired: Where do you consider more feasible to teach an online class?
A ( ) In an official site of the University as "Moodle"
B ( ) In an unofficial site as "Google Docs"
B ( ) In a social network as "Facebook"

5.- Have you taken any class, course or diploma, online or Internet supported?	**6.- Have you given any class, course or diploma, online or Internet supported?**
No ( ) Yes ( ) Which one?	No ( ) Yes ( ) Which one?
Please describe how was your experience, either positive or negative	Please describe how was your experience, either positive or negative
7.- Do you consider that education's quality TOTALLY online can be:	**8.- Do you consider that education's quality just SUPPORTED by internet can be:**
A( )Same as in the classroom B( )Better than in the classroom C( )Worse than in the classroom D( )I do not know/ I have no idea.	A( )Same as in the classroom B( )Better than in the classroom C( )Worse than in the classroom D( )I do not know/ I have no idea.
9.- If all the technical and educational aspects are covered, do you believe that teaching Physical Education TOTALLY Internet could be the same as in the classroom?	**10.- If all the technical and educational aspects are covered, do you believe that teaching Physical Education just SUPPORTED by Internet could be the same as in the classroom?**
Yes ( ) No ( ) why?	Yes ( ) No ( ) why?
11.- Do you consider that the theoretical subjects in the FCCF:	**12.- Do you consider that the practical subjects in the FCCF:**

A( )Can be totally taught by Internet B( ) Can be taught with some Internet support	A( )Can be totally taught by Internet B( ) Can be taught with some Internet support
13.- Which subject do you taught regularly	**14.- With the appropriate training and technical support Do you think that your subject is entirely possible to be taught TOTALLY by internet, or just SUPPORTED by Internet?**
Subject 1	TOTALLY ( ) just SUPPORTED by Internet ( )
Subject 2	TOTALLY ( ) just SUPPORTED by Internet ( )
Subject 3	TOTALLY ( ) just SUPPORTED by Internet ( )

15.- Having the training and technical support, Would you consider impart your subject entirely online?					
Subject 1	Yes ( ) Not sure, would have to think ( ) No ( ) why?				
Subject 2	Yes ( ) Not sure, would have to think ( ) No ( ) why?				
Subject 3	Yes ( ) Not sure, would have to think ( ) No ( ) why?				
16.- Having the training and technical support, Would you consider impart your subject just SUPPORTED by Internet?					
Subject 1	Yes ( ) Not sure, would have to think ( ) No ( ) why?				
Subject 2	Yes ( ) Not sure, would have to think ( ) No ( ) why?				
Subject 3	Yes ( ) Not sure, would have to think ( ) No ( ) why?				
17.- Please check the % that your subject is more practical than theoretical:					
Subject 1	100% Theory	75% Theory	50% Theory/50% practical	75% practical	100% practical
Subject 2	100% Theory	75% Theory	50% Theory/50% practical	75% practical	100% practical
Subject 3	100% Theory	75% Theory	50% Theory/50% practical	75% practical	100% practical

18.- Select as many options as desired. What do you consider as difficulties to teach online classes?

A ( ) Teaching contents

B ( ) Evaluate the contents

C ( ) Lack of appropriate pedagogical training to teach online classes

D ( ) Lack of technical support (platforms, software and specific applications to my subject)

E ( ) Students' unwillingness

F ( ) professors' unwillingness

Thank you.

Appendix 2a: PROFESSORS' QUESTIONNAIRE FOR THOUGHTS ABOUT ONLINE

EDUCATION IN A PETE (SPANISH VERSION).

Esta encuesta es parte de un estudio sobre el uso de Internet en Educación Física y es parte de un proyecto de doctorado. La encuesta está diseñada para el personal de la Facultad de Ciencias de la Cultura Física y tiene como objetivo comprender los sentimientos del personal sobre el uso de Internet en clase.

Agradeceríamos su honestidad en sus respuestas para comprender su pensamiento sobre la educación en línea en el área de Educación Física.

Al completar este cuestionario, nos autoriza a recopilar esta información de usted.

Seleccione la opción deseada. Agradeceríamos sus comentarios en las preguntas que requieren que ingrese su opinión. Gracias.

Edad (   )   Género M (   ) F (   )   Titulo (LEF, Contador, etc.)_____

1.- Defina educación online o virtual.

2.- ¿Cuál de las siguientes tecnologías ha manejado o utiliza?:

Lap top (   )   PC (   )   tablet(   ) Redes sociales   (   ) ¿Otra?_____

3.- En cuanto al trabajo en clase con sus alumnos:

¿Qué significa para usted autonomía?:
¿Cómo la promueve en su clase?
¿Qué significa para usted autorregulación?:
¿Cómo la promueve en su clase?

4.- Seleccione tantas opciones como desee: ¿Dónde considera más factible impartir una clase por Internet?

     A (   ) En un sitio oficial de la Universidad como "Moodle"

     B (   ) En un sitio no oficial como "Google Docs"

     B (   ) En una red social como "Facebook"

5.- ¿Ha tomado alguna clase, curso, diplomado, taller por internet o con apoyo de Internet? No ( ) Si( ) ¿cuáles?	**6.- ¿Ha impartido alguna clase, curso, diplomado, taller por internet o con apoyo de Internet?** No ( ) Si( ) ¿cuáles?
Describa por favor cómo fue su experiencia, ya sea positiva o negativa	Describa por favor cómo fue su experiencia, ya sea positiva o negativa
7.- Considera que la calidad de la educación TOTALMENTE por internet puede ser: A( )Igual como la del salón de clases B( )Mejor que la del salón de clases C( )Peor que la del salón de clases D ( ) No se/ No tengo idea.	**8.- Considera que la calidad de la educación CON APOYO de Internet puede ser:** A( )Igual como la del salón de clases B( )Mejor que la del salón de clases C( )Peor que la del salón de clases D ( ) No se/ No tengo idea.
9- Si todos los aspectos técnicos y pedagógicos se cubren, considera que enseñar educación física TOTALMENTE en Internet podría ser igual como en el salón. Si ( ) No ( ) ¿Por qué?	**10.- Si todos los aspectos técnicos y pedagógicos se cubren, considera que enseñar educación física CON APOYO de Internet, podría ser igual como en el salón.** Si ( ) No ( ) ¿Por qué?

11.- **Considera que las materias TEÓRICAS de la FCCF:**	12.- **Considera que las materias PRÁCTICAS de la FCCF:**
A( )Pueden impartirse totalmente por Internet B( )Pueden impartirse con algo de apoyo de Internet	A( )Pueden impartirse totalmente por Internet B( )Pueden impartirse con algo de apoyo de Internet
13.- **Escriba el nombre de la materia(s) que imparte regularmente**	14.- **Con la capacitación y el apoyo técnico correspondiente** ¿Considera que esta materia es posible impartirla **TOTALMENTE** por Internet o solo **CON APOYO** de Internet?
Materia 1	TOTALMENTE ( ) CON APOYO de Internet ( )
Materia 2	TOTALMENTE ( ) CON APOYO de Internet ( )
Materia 3	TOTALMENTE ( ) CON APOYO de Internet ( )

15.- **Contando con la capacitación y el apoyo técnico correspondiente,**
¿Consideraría impartir su materia **TOTALMENTE** por Internet?

Materia 1	Si ( ) No estoy seguro, tendría que pensarlo ( ) No ( ) ¿Por qué?
Materia 2	Si ( ) No estoy seguro, tendría que pensarlo ( ) No ( ) ¿Por qué?
Materia 3	Si ( ) No estoy seguro, tendría que pensarlo ( ) No ( ) ¿Por qué?

16.- **Contando con la capacitación y el apoyo técnico correspondiente,**
¿Consideraría impartir su materia **CON APOYO** de Internet?

Materia 1	Si ( ) No estoy seguro, tendría que pensarlo ( ) No ( ) ¿Por qué?
Materia 2	Si ( ) No estoy seguro, tendría que pensarlo ( ) No ( ) ¿Por qué?
Materia 3	Si ( ) No estoy seguro, tendría que pensarlo ( ) No ( ) ¿Por qué?

17.- **Por favor marque el % en que su materia es más práctica o teórica:**

Materia 1	100% Teórica 100%Práctica	75%Teórica	50% Teoría/50% práctica	75% práctica	
Materia 2	100% Teórica Práctica	75%Teórica	50% Teoría/50% práctica	75% práctica	100%
Materia 3	100% Teórica Práctica	75%Teórica	50% Teoría/50% práctica	75% práctica	100%

18.- **Seleccione tantas opciones como desee. ¿Cuáles considera como dificultades para impartir clases online?**

- A (   ) Enseñar los contenidos
- B (   ) Evaluar los contenidos
- C (   ) Falta de capacitación pedagógica apropiada para impartir clases online o virtuales
- D (   ) Falta de apoyo técnico (plataformas, software y aplicaciones específicas para mi materia)
- E (   ) Falta de Disposición de los alumnos
- F (   ) Falta de Disposición de los directivos
- D(   )Otra_____

Gracias.

Appendix 2: STUDENTS' QUESTIONNAIRE FOR THOUGHTS ABOUT ONLINE

EDUCATION IN A PETE (ENGLISH VERSION).

This survey is part of a study of Internet use in Physical Education and is part of a PhD project. The survey is designed for students from the Faculty of Physical Culture and aims understand your feelings about using the Internet in class.

We would appreciate your honesty in your responses to gain an understanding of your thinking about online education in the area of Physical Education.

By completing this questionnaire you are consenting to us collecting this data from you.

Select the desired option. We would appreciate your comments in the questions that require you to enter your opinion. Thank you.

Age( )Semester (   ) Gender M( ) F( )

1.- Do you have Internet access, outside the faculty? YES( ) NO( )

2.- ¿Which of the following technologies has used?: lap top( )PC( )tablet( )

Otro_____

3.- What do you understand by online education?

4.- Where do you consider more feasible to teach an online class?

Internet (   ) Classroom(   )

5.- Have you taken any class, course or diploma, online or Internet supported? No ( ) Yes ( ) Which one?	**6.- Have you taken any class, course that use a own system (no Hotmail or Facebook) to send the tasks, homework and receive grades?** No ( ) Yes ( ) Which one?
Please describe how was your experience, either positive or negative	Please describe how was your experience, either positive or negative
7.- Do you consider that education's quality TOTALLY online can be: A( )Same as in the classroom B( )Better than in the classroom C( )Worse than in the classroom D( )I do not know/ I have no idea.	**8.- Do you consider that education's quality just SUPPORTED by internet can be:** A( )Same as in the classroom B( )Better than in the classroom C( )Worse than in the classroom D( )I do not know/ I have no idea.

9.- If all the technical and educational aspects are covered, do you consider that the Physical Education bachelor TOTALLY imparted by Internet could be the same as in the classroom? Yes ( ) No ( ) why?	**10.- If all the technical and educational aspects are covered, do you consider that the Physical Education bachelor just SUPPORTED by Internet could be the same as in the classroom?** Yes ( ) No ( ) why?
11.- **Do you consider that the theoretical subjects in the FCCF:** A( )Can be totally taught by Internet B( ) Can be taught with some Internet support	12.- **Do you consider that the practical subjects in the FCCF:** A( )Can be totally taught by Internet B( ) Can be taught with some Internet support
13.- Do you think that an online class can ensure the practical part as in the classroom? Yes ( ) No ( )	**14.- If an online class ensure you working the practical part as in the classroom, would you take it?** Si ( ) No ( )
15.- Where would you prefer to take a class online? A ( ) In an official site of the University as Moodle B ( ) I have not used the University Moodle C ( ) In a social network like Facebook D ( ) On another social network, which one? E ( ) I do not use social networks	**16.- Select as many options as you like. What are some difficulties to take a PE's bachelor online?** A ( ) The student-teacher feedback is not the same as in the classroom. B ( ) The student-student interaction is not the same as in the classroom. C ( ) The practical part of the subjects could be affected. D ( ) Other

17.- Do you consider that a graduate of Physical Education who studied via Internet, will be equally prepared as a graduate from the traditional classroom?
YES( ) why?_____
NO( ) Why?_____
FINALLY: If you want to participate in a pilot test about online education in our faculty, write your phone number _____or e-mail _____ _____ or stated right when do you deliver this survey.
Thanks

Appendix 2a: STUDENTS' QUESTIONNAIRE FOR THOUGHTS ABOUT ONLINE

EDUCATION IN A PETE (SPANISH VERSION).

Esta encuesta es parte de un estudio sobre el uso de Internet en Educación Física y es parte de un proyecto de doctorado. La encuesta está diseñada para estudiantes de la Facultad de Cultura Física y pretende comprender sus sentimientos sobre el uso de Internet en clase.
Agradeceríamos su honestidad en sus respuestas para comprender su pensamiento sobre la educación en línea en el área de Educación Física.
Al completar este cuestionario, nos autoriza a recopilar esta información de usted.
Seleccione la opción deseada. Agradeceríamos sus comentarios en las preguntas que requieren que ingrese su opinión. Gracias.
Edad (   ) Semestre (   ) Género H (   ) M (   )
1.- ¿Tienes acceso a Internet, fuera de la escuela? Si (   ) NO (   )
2.- ¿Cuál de las siguientes tecnologías has usado o utilizas: lap top (   ) PC (   ) Tablet (   )
Otro_____
3.- ¿Qué entiendes por educación online?
4.- ¿Dónde consideras que sea más fácil aprender, por internet o en el salón de clases?
 Internet (   ) Salón(   )

5.- ¿Has tomado alguna clase o curso por internet o con apoyo de Internet?	**6.- ¿ ¿Has tomado alguna clase o curso que use un sistema propio de Internet para mandar trabajos, tareas y recibir calificaciones como apoyo?(no Hotmail o Facebook)**
No ( ) Si( ) ¿cuáles?	No ( ) Si( ) ¿cuáles?
Describe por favor cómo fue tu experiencia, ya sea positiva o negativa	Describe por favor cómo fue tu experiencia, ya sea positiva o negativa
7.- Consideras que la calidad de la educación TOTALMENTE por internet puede ser:	**8.- Consideras que la calidad de la educación CON APOYO de Internet puede ser:**
A( )Igual como la del salón de clases B( )Mejor que la del salón de clases C( )Peor que la del salón de clases D ( ) No se/ No tengo idea.	A( )Igual como la del salón de clases B( )Mejor que la del salón de clases C( )Peor que la del salón de clases D ( ) No se/ No tengo idea.

9.- Si todos los aspectos técnicos y pedagógicos se cubren, consideras que la carrera de educación física TOTALMENTE por Internet podría ser igual como en el salón.	**10.- Si todos los aspectos técnicos y pedagógicos se cubren, consideras que la carrera de educación física CON APOYO por Internet podría ser igual como en el salón.**
Si ( ) No ( ) ¿Por qué?	Si ( ) No ( ) ¿Por qué?
11.- Considera que las materias **TEÓRICAS** de la FCCF:	12.- Considera que las materias **PRÁCTICAS** de la FCCF:

231

A( )Pueden impartirse totalmente por Internet B( )Pueden impartirse con algo de apoyo de Internet	A( )Pueden impartirse totalmente por Internet B( )Pueden impartirse con algo de apoyo de Internet
13.- ¿Crees que una clase online puede asegurar trabajar la parte práctica como en el salón de clases?	**14.- Si una clase online te asegurará trabajar la parte práctica como en el salón de clases, ¿la tomarías?**
Si ( ) No ( )	Si ( ) No ( )
15.- ¿Dónde preferirías tomar una clase por Internet?	**16.- Selecciona tantas opciones como desees. ¿Cuáles serían algunas dificultades por las que no debería tomarse la carrera de LEF por internet?**
A( )En un sitio oficial de la Universidad como Moodle B( )No he utilizado el Moodle de la Universidad C( )En una red social como Facebook D ( ) En otra red social, ¿cuál?_____ E ( ) No uso redes sociales.	A ( ) La retroalimentación alumno-maestro no es igual que en el salón. B ( ) La interacción alumno-alumno no es igual que en el salón. C ( ) La parte práctica de las materias se ve afectada. D( )Otra, ¿cuál?_____

17.- ¿Consideras que un Licenciado en Educación Física que estudió por Internet, estará igual de preparado que uno egresado del salón de clases?

SI ( ) ¿Por qué?_____

No ( ) ¿Por qué?_____

FINALMENTE: Si deseas participar en una prueba piloto sobre educación online en nuestra facultad, anota tu teléfono_____ e-mail _____ o indícalo directamente al entregar esta encuesta.

Gracias

Appendix 3: STUDENTS AND PROFESSORS FOCUS GROUP QUESTIONS. BASED ON CONCEPTS FROM SELF-REGULATED LEARNING AND SELF-DETERMINATION THEORY.

(Version 1, 28 July 2015)
STUDENT FOCUS GROUP QUESTIONS

(Note: The focus group is intended to start a discussion and then maintain it. There will some be warm up questions to share current experiences, and then one main question with follow-up questions used as required.)

Warm up questions:

- What is your experience of studying in this program?
- How motivated do you feel in school right now?
- Do you feel like you have choices about some aspects in your subjects?
- Do you think that are you using those in the school? How?
- How is the faculty helping you to be more autonomous?

Main question: What do you think about online education?

Possible follow up questions:

- Do you think that could be resistance from PETE students to use TELEs?
- How can we as a faculty change that?
- Is face to face contact important in PETE? Why?
- Do you feel that it's too hard to do tasks on your own?
- Do you have preference about theoretical or practical tasks?
- Does that affect your motivation about the task?
- Which one is a better option for educational purposes, social media (Facebook) or official media (University's Moodle)?
- Do you think that motivation will be better or worse online?

PPOFESSOR FOCUS GROUP QUESTIONS

(Note: The focus group is intended to start a discussion and then maintain it. There will some be warm up questions to share current experiences, and then one main question with follow-up questions used as required.)

Warm up questions:

- What is your experience of teaching in this program?
- How motivated do you feel in your teaching right now?
- Do you think we encourage students to be autonomous?

Main question: What do you think about online education?

Possible follow up questions:

- Do you think that could be resistance from PETE students to use TELEs? What about professors?
- How can we as a faculty change that?
- Is face to face contact important in PETE? Why?
- Do you teach theoretical or practical tasks?
- Does that affect your approach to teaching?
- Which one is a better option for educational purposes, social media (Facebook) or official media (University's Moodle)?
- Do you think that student motivation will be better or worse online?
- What sort of choices do you make about teaching your subject?
- Do you feel as a teacher that online education is a context where you can be successful?
- Have you been able to learn interesting new online teaching skills recently? How do you feel about it?

Appendix 4: ETHICAL APPROVAL LETTER FROM UNIVERSITY OF WOLLONGONG
ETHICS COMMITTEE.

UNIVERSITY OF
WOLLONGONG
AUSTRALIA

APPROVAL LETTER
In reply please quote: HE15/311

28 August 2015

Professor Sue Bennett
Faculty of Social Sciences
School of Education
University of Wollongong

Dear Professor Bennett,

Thank you for your response dated 20 August 2015 to the HREC review of the application detailed below. I am pleased to advise that the application has been approved.

Ethics Number:	HE15/311
Project Title:	Technology enhanced Learning Environments within Physical Education Teacher Education: Application of Self-Regulated Learning and Self-Determination Theory
Researchers:	Professor Sue Bennett, Dr Dana Perlman, Mr Fernando Mondaca-Fernandez
Documents Approved:	Initial Ethics Application
	Response to Review received 20/8/15
	Consent Form for University Students - Phase 1 Focus Group – V1 - 18/8/15
	Consent Form for University Students - Phase 2, 3 and 4 – V2 - 18/8/15
	Participant Information Sheet for Staff – Phase 1 – V2 -18/8/15
	Participant Information Sheet for Staff – Phase 2-4 only – V2 - 18/8/15
	Participant Information Sheet for Students – V2 -18/8/15
	Staff Questionnaire Phase 1 – V2 -18/8/15
	Student Questionnaire Phase 1 – V2 -18/8/15
	Appendix B – Student Focus Group Questions – V1 -28/7/15
	Appendix C – Student Interview Protocol – V1 -28/7/15
	Consent Form for University Professors - V1 -28/7/15

Appendix 5: PARTICIPANT INFORMATION SHEET FOR STUDENTS

(Version 2, 18 August 2015)

UNIVERSITY OF WOLLONGONG
AUSTRALIA

TITLE: *Technology Enhanced Learning Environments (TELEs) within Physical Education Teacher Education: Application of Self - Regulated Learning and Self -Determination Theory.*

PURPOSE OF THE RESEARCH
This is an invitation to participate in a study conducted by researchers at the University of Wollongong. The purpose of the research is to investigate the challenges and influence of Technology Enhanced Learning Environments on students of physical education teacher education, in the aspects of motivation and self- regulation.

INVESTIGATORS

Dr Sue Bennett (Team Leader)	Dr Dana Perlman	Fernando Mondaca-Fernandez
Faculty of Social Sciences	Faculty of Social Sciences	Faculty of Social Sciences
sbennett@uow.edu.au	dperlman@uow.edu.au	fmf827@uowmail.edu.au
+61 (2) 4221 5738		

METHOD AND DEMANDS ON PARTICIPANTS

There are four phases stages to this study.
In **Phase 1** we are inviting all students enrolled in second semester of the program to complete a questionnaire and small group discussion.

The questionnaire will ask about your thoughts about using online education in physical education programs. The questionnaire is <u>anonymous</u> and will take about 30 minutes to complete. By completing the questionnaire you consent for us to collect this information from you. Typical questions in the questionnaire include:
-   Have you taken any class, course or diploma, fully online?
-   Do you think that an online or virtual classroom can ensure the practical components of a PE bachelor program is effective?
-   If an online or virtual classroom work will ensure you can work on the practical components, would you take it?

We will also ask for volunteers to participate in a 1.5-hour focus group to discuss topics in depth, with some questions in the focus group include:
-   What do you think about online education?
-   Do you think that could be resistance from PETE students to use of TELEs?
-   Which one is a better option to educational purposes, social media (Facebook) or official media (University's Moodle)?

These interviews will be audio recorded and transcribed for analysis. Only the researchers will have access to the recordings and transcripts.
In **Phase 2, 3 and 4**, we will invite all students eligible to enroll in a special additional instance of Gymnastics 2. From the pool of volunteers we will randomly select 10 participants to participate in these three inter-linked phases. These participants will be asked to assist with

236

developing the TELE for PE by contributing to informal meetings and evaluating prototypes of the environment (Phase 2), completing the TELE as part of their normal studies (Phase 3), and then contributing to a discussion of the outcomes (Phase 4). The meetings involved in Phase 2 and 4 will take up around two hours of your time.

During the semester participants will be asked to meet with the researcher for individual interviews about their experiences. Questions will include:
- What have you been working on in the TELE?
- What do you like about the experience of learning in the TELE?
- What don't you like about it?
- How have you been organizing your time?
- What interactions have you had with professors and other students?

These interviews will be audio recorded and transcribed for analysis. Only the researchers will have access to the recordings and transcripts. Interviews will be held at your convenience and will take no more than two hours of your time.
We will also ask to collect copies of your print and electronic communications in Gymnastics II, including your reflective journal and forum contributions. This will not require any of your time.

POSSIBLE RISKS, INCONVENIENCES AND DISCOMFORTS

Participation in Phases 2, 3 and 4 involves a significant amount of time. This is because this type of participatory research is committed to working directly with stakeholders, in this case students and staff. Your involvement in the study is voluntary and you may withdraw your participation from the study at any time and withdraw any data that you have provided to that point. To withdraw you can contact any member of the research team by email or speak to the local researcher in person. A decision not to participate in the study will not affect your relationship with the University of Chihuahua or the University of Wollongong. Should you withdraw, no further data would be collected from you, data already collected would be destroyed and you would complete the subject as usual.

BENEFITS OF THE RESEARCH
This research will provide a basis for future decisions on the development and implementation of Technology Enhanced Learning Environments (TELEs) within Physical Education Teacher Education programs. Findings from the study will be published in a thesis and possibly published in educational journals. Confidentiality is assured, and you will not be identified in any part of the research.
You may also time that talking about your study habits helps you to focus more on your work and develops your study skills.

ETHICS REVIEW AND COMPLAINTS
This study has been reviewed by the Human Research Ethics Committee (Social Science, Humanities and Behavioral Science) of the University of Wollongong. If you have any concerns or complaints regarding the way this research has been conducted, you can contact the UOW Ethics Officer on +61 (2) 4221 3386 or email rso-ethics@uow.edu.au.

Thank you for your interest in this study.

Appendix 6: PARTICIPANT INFORMATION SHEET FOR STAFF

Phase 1 (Version 2, 18 August 2015)

TITLE: *Technology Enhanced Learning Environments (TELEs) within Physical Education Teacher Education: Application of Self - Regulated Learning and Self -Determination Theory.*

PURPOSE OF THE RESEARCH

This is an invitation to participate in a study conducted by researchers at the University of Wollongong. The purpose of the research is to investigate the challenges and influence for physical education teachers when they use Technology Enhanced Learning Environments for teaching.

INVESTIGATORS

Dr Sue Bennett (Team Leader)	Dr. Dana Perlman	Fernando Mondaca-Fernandez
Faculty of Social Sciences	Faculty of Social Sciences	Faculty of Social Sciences
sbennett@uow.edu.au	dperlman@uow.edu.au	fmf827@uowmail.edu.au

METHOD AND DEMANDS ON PARTICIPANTS

There are four phases stages to this study.

In **Phase 1** we are inviting all staff in the program to complete a questionnaire and small group discussion.

If you choose to be included, you will be asked to fill a questionnaire about thoughts to using online education in physical education programs. The questionnaire is anonymous and will take about 30 minutes to complete. By completing the questionnaire you consent for us to collect this information from you. Typical questions in the questionnaire include:

- Have you taken any class, course or diploma, online or Internet supported?
- With all of the technical and educational aspects covered, do you believe that teaching online can be as effective as teaching in the classroom?
- Do you consider your subject can be taught online?

We also wish to invite you to a 1.5-hour focus group to discuss topics in depth, with some questions in the focus group include:

- What sort of choices do you make about teaching your subject?
- Do you feel as a teacher that online education is a context where you can be successful?
- Have you been able to learn interesting new online teaching skills recently? How do you feel about it?

These interviews will be audio recorded and transcribed for analysis. Only the researchers will have access to the recordings and transcripts.

In Phase 2, 3 and 4, staff involved in special additional instance of Gymnastics 2 will design, develop, teacher and reflect on a TELE for Physical Education Teacher Education. The results of this study will be available to all participants.

POSSIBLE RISKS, INCONVENIENCES AND DISCOMFORTS
Participation in the study involves a significant amount of time. This is because this type of participatory research is committed to working directly with stakeholders, in this case students and staff. Your involvement in the study is voluntary and you may withdraw your participation from the study at any time and withdraw any data that you have provided to that point. you may withdraw your participation from the study at any time and withdraw any identifiable data that you have provided to that point. To withdraw you can contact any member of the research team by email or speak to the local researcher in person. A decision not to participate in the study will not affect your relationship with the University of Chihuahua or the University of Wollongong.

BENEFITS OF THE RESEARCH
This research will provide a basis for future decisions on the development and implementation of Technology Enhanced Learning Environments (TELEs) within Physical Education Teacher Education programs. Findings from the study will be published in a thesis and possibly published in educational journals. Confidentiality is assured, and you will not be identified in any part of the research.

You may also time that talking about your teaching helps you to reflect more on your work and develops your skills.

ETHICS REVIEW AND COMPLAINTS
This study has been reviewed by the Human Research Ethics Committee (Social Science, Humanities and Behavioral Science) of the University of Wollongong. If you have any concerns or complaints regarding the way this research has been conducted, you can contact the UOW Ethics Officer on +61 (2) 4221 3386 or email rso-ethics@uow.edu.au.

Thank you for your interest in this study.

Appendix 6a: PARTICIPANT INFORMATION SHEET FOR STAFF

Phase 2-4 only (Version 2, 18 August 2015)

TITLE: *Technology Enhanced Learning Environments (TELEs) within Physical Education Teacher Education: Application of Self - Regulated Learning and Self -Determination Theory.*

PURPOSE OF THE RESEARCH
This is an invitation to participate in a study conducted by researchers at the University of Wollongong. The purpose of the research is to investigate the challenges and influence for physical education teachers when they use Technology Enhanced Learning Environments for teaching.

INVESTIGATORS

Dr Sue Bennett (Team Leader)	Dr. Dana Perlman	Fernando Mondaca-Fernandez
Faculty of Social Sciences	Faculty of Social Sciences	Faculty of Social Sciences
sbennett@uow.edu.au	dperlman@uow.edu.au	fmf827@uowmail.edu.au

METHOD AND DEMANDS ON PARTICIPANTS

There are four phases stages to this study.

In **Phase 1** we are inviting all staff in the program to complete a questionnaire and small group discussion.

If you choose to be included, you will be asked to fill a questionnaire about thoughts to using online education in physical education programs. The questionnaire is anonymous and will take about 30 minutes to complete. By completing the questionnaire you consent for us to collect this information from you. Typical questions in the questionnaire include:

- Have you taken any class, course or diploma, online or Internet supported?
- With all of the technical and educational aspects covered, do you believe that teaching online can be as effective as teaching in the classroom?
- Do you consider your subject can be taught online?

We also wish to invite you to a 1.5-hour focus group to discuss topics in depth, with some questions in the focus group include:

- What sort of choices do you make about teaching your subject?
- Do you feel as a teacher that online education is a context where you can be successful?
- Have you been able to learn interesting new online teaching skills recently? How do you feel about it?

These interviews will be audio recorded and transcribed for analysis. Only the researchers will have access to the recordings and transcripts.

In Phase 2, 3 and 4, participants will be asked to assist with developing the TELE for PE by contributing to informal meetings and evaluating prototypes of the environment, teaching the TELE as part of their normal duties, and then contributing to a discussion of the outcomes. The meetings will take up no more than 3 hours of your time.

During the semester participants will be asked to meet with the researcher for individual interviews about their experiences. Questions will include:
- What have you been working on in the TELE?
- What do you like about the experience of teaching in the TELE?
- What don't you like about it?
- How have you been organizing your time?
- What interactions have you had with the other professor and students?

These interviews will be audio recorded and transcribed for analysis. Only the researchers will have access to the recordings and transcripts. Interviews will be held at your convenience and will take no more than two hours of your time.

POSSIBLE RISKS, INCONVENIENCES AND DISCOMFORTS
Participation in the study involves a significant amount of time. This is because this type of participatory research is committed to working directly with stakeholders, in this case students and staff. Your involvement in the study is voluntary and you may withdraw your participation from the study at any time and withdraw any data that you have provided to that point. you may withdraw your participation from the study at any time and withdraw any identifiable data that you have provided to that point. To withdraw you can contact any member of the research team by email or speak to the local researcher in person. A decision not to participate in the study will not affect your relationship with the University of Chihuahua or the University of Wollongong.

BENEFITS OF THE RESEARCH
This research will provide a basis for future decisions on the development and implementation of Technology Enhanced Learning Environments (TELEs) within Physical Education Teacher Education programs. Findings from the study will be published in a thesis and possibly published in educational journals. Confidentiality is assured, and you will not be identified in any part of the research.

You may also time that talking about your teaching helps you to reflect more on your work and develops your skills.

ETHICS REVIEW AND COMPLAINTS
This study has been reviewed by the Human Research Ethics Committee (Social Science, Humanities and Behavioral Science) of the University of Wollongong. If you have any concerns or complaints regarding the way this research has been conducted, you can contact the UOW Ethics Officer on +61 (2) 4221 3386 or email rso-ethics@uow.edu.au.

Thank you for your interest in this study.

Appendix 7: CONSENT FORM FOR UNIVERSITY STUDENTS

PHASE 1 Focus Group (Version 2, 18 August 2015)

UNIVERSITY OF WOLLONGONG AUSTRALIA

Research Title: Technology Enhanced Learning Environments within Physical Education Teacher Education: Application of Self-Regulated learning and Self-Determination Theory
Researcher: Fernando Mondaca-Fernandez
I have been given information about "Technology Enhanced Learning Environments within Physical Education Teacher Education: Application of Self-Regulated learning and Self-Determination Theory". I have discussed this research project with Fernando Mondaca-Fernandez, the subject coordinator of Gymnastics II offered by Faculty of Physical Culture Science from the Autonomous University of Chihuahua. This is part of a PhD degree supervised by Professor Sue Bennett from the School of Education at the University of Wollongong.
I understand that, if I consent to participate in this project, I will be asked to participate in a 1.5-hour focus group to discuss topics in depth, with some questions in the focus group include:
- What do you think about online education?
- Do you think that could be resistance from PETE students to use of TELEs?
- Which one is a better option to educational purposes, social media (Facebook) or official media (University's Moodle)?
These interviews will be audio recorded and transcribed for analysis. Only the researchers will have access to the recordings and transcripts.
I understand that my contribution will be confidential and that there will be no personal identification in the data that I agree to allow to be used in the study.
I understand that the time commitment is the main burden associated with this study.

I have had an opportunity to ask Fernando Mondaca-Fernandez any questions I may have about the research and my participation. I understand that my participation in this research is voluntary, I have been invited to participate and I am free to withdraw from the research at any time. My nonparticipation or withdrawal of consent will not affect my relationship with the Faculty of Physical Culture Science in my course/program of study in Physical Education.
If I have any enquires about the research, I can contact Fernando Mondaca-Fernandez and/or Professor Sue Bennett. If I have any concerns or complaints regarding the way the research is or has been conducted, I can contact the UOW Ethics Officer on +61 (2) 4221 3386 or email rso-ethics@uow.edu.au
By signing below, I am indicating my consent to participate in the research. I understand that the data collected from my participation will be used primarily for a PhD thesis, and will also be used in summary form for journal publication, and I consent for it to be used in that manner.
Signed... Date......./....../......

Name (please print)   ....

Appendix 7a: CONSENT FORM FOR UNIVERSITY STUDENTS

PHASES 2, 3 and 4 (Version 2, 18 August 2015)

UNIVERSITY OF WOLLONGONG
AUSTRALIA

Research Title: Technology Enhanced Learning Environments within Physical Education Teacher Education: Application of Self-Regulated learning and Self-Determination Theory
Researcher: Fernando Mondaca-Fernandez
I have been given information about "Technology Enhanced Learning Environments within Physical Education Teacher Education: Application of Self-Regulated learning and Self-Determination Theory". I have discussed this research project with Fernando Mondaca-Fernandez, the subject coordinator of Gymnastics II offered by Faculty of Physical Culture Science from the Autonomous University of Chihuahua. This is part of a PhD degree supervised by Professor Sue Bennett from the School of Education at the University of Wollongong.
I understand that, if I consent to participate in this project, I will be asked to participate in:
- develop the TELE for PE by contributing to informal meetings and evaluating prototypes of the environment (Phase 2)
- complete the TELE as part of my normal studies (Phase 3),
- contribute to a discussion of the outcomes (Phase 4).
I give my consent to the following data collection activities:
- ☐ I consent to being interviewed during the semester about my experiences of the TELE. I understand that these interviews will be audio recorded and transcribed for analysis, and that only the researchers will have access to the recordings and transcripts.
- ☐ I consent for the researchers to collect copies of my print and electronic communications in Gymnastics II, including my reflective journal and forum contributions.
I understand that my contribution will be confidential and that there will be no personal identification in the data that I agree to allow to be used in the study.
I understand that the time commitment is the main burden associated with this study.

I have had an opportunity to ask Fernando Mondaca-Fernandez any questions I may have about the research and my participation. I understand that my participation in this research is voluntary, I have been invited to participate and I am free to withdraw from the research at any time. My nonparticipation or withdrawal of consent will not affect my relationship with the Faculty of Physical Culture Science in my course/program of study in Physical Education.

If I have any enquires about the research, I can contact Fernando Mondaca-Fernandez and/or Professor Sue Bennett. If I have any concerns or complaints regarding the way the research is or has been conducted, I can contact the UOW Ethics Officer on +61 (2) 4221 3386 or email rso-ethics@uow.edu.au.

By signing below, I am indicating my consent to participate in the research. I understand that the data collected from my participation will be used primarily for a PhD thesis, and will also be used in summary form for journal publication, and I consent for it to be used in that manner.
Signed... Date......./....../......

Name (please print)...

Appendix 8: CONSENT FORM FOR UNIVERSITY PROFESSORS

 (Version 1, 28 July 2015)

UNIVERSITY OF WOLLONGONG
AUSTRALIA

Research Title: Technology Enhanced Learning Environments within Physical Education Teacher Education: Application of Self-Regulated learning and Self-Determination Theory
Researcher: Fernando Mondaca-Fernandez

I have been given information about "Technology Enhanced Learning Environments within Physical Education Teacher Education: Application of Self-Regulated learning and Self-Determination Theory". I have discussed this research project with Fernando Mondaca-Fernandez, the coordinator of the research to be conducted in the Faculty of Physical Culture Science from the Autonomous University of Chihuahua. This is part of a PhD degree supervised by Professor Sue Bennett from the School of Education at the University of Wollongong.
I understand that, if I consent to participate in this project, I will be asked to allow copies of my print and electronic communications in Gymnastics II, including my reflective journal and forum contributions, to be used in the study. I also consent to participate in a questionnaire and interview to be conducted through and after the academic session. I understand that my contribution will be confidential and that there will be no personal identification in the data that I agree to allow to be used in the study. I understand that there are no potential risks or burdens associated with this study.
I have had an opportunity to ask Fernando Mondaca-Fernandez any questions I may have about the research and my participation. I understand that my participation in this research is voluntary, I have been invited to participate and I am free to withdraw from the research at any time. My nonparticipation or withdrawal of consent will not affect my relationship with the Faculty of Physical Culture Science.
If I have any enquires about the research, I can contact Fernando Mondaca-Fernandez (614 2766786 and/or Professor Sue Bennett (02) 4221 5738. If I have any concerns or complaints regarding the way the research is or has been conducted, I can contact the Ethics Officer, Human Research Ethics Committee, University of Wollongong on 4221 3386 or email rso-ethics@uow.edu.au
By signing below, I am indicating my consent to participate in the research. I understand that the

data collected from my participation will be used primarily for a PhD thesis, and will also be

used in summary form for journal publication, and I consent for it to be used in that manner.

Signed.. Date......./....../......

Name (please print)...

Appendix 9: WITHDRAWAL LETTER (English version)

University of Chihuahua

To whom may it concern:

I would like to withdraw my participation from the research:
Technology Enhanced Learning Environments within Physical Education Teacher Education:
Application of Self - Regulated Learning and Self -Determination Theory.
And revoke my authorization to use and/or disclose my personal information in connection with
my study participation.
I am aware that information already collected will continue to be used and/or disclosed as
described in the research consent and authorization form, which I signed when enrolling into the
study.
At this point, in addition to ending study participation, I would like to:

( ) **Withdraw from the study and revoke authorization**
I revoke my authorization for the use and/or disclosure of my future information.
( ) **Withdraw from the study, but continue authorization**
I allow the research team to continue collecting information from my TELE records.
*This would be done only as needed to support the goals of the study and would not be used for
purposes other than those already discussed in the research consent and authorization form.*

I understand that I will receive confirmation of this withdrawal letter.

_____   _____
Signature of Study Participant   Date

_____
Printed Name of Study Participant
Optional:
I am ending my participation in the above referenced study because:

Appendix 9a: WITHDRAWAL LETTER (Spanish version)

Universidad de Chihuahua
A quien corresponda:

Me gustaría retirar mi participación de la investigación:

Entornos de Aprendizaje Mejorado en Tecnología dentro de la Educación de Profesores de Educación Física: Aplicación del Aprendizaje Autorregulado y la Teoría de la Autodeterminación.

Y revocar mi autorización para usar y / o divulgar mi información personal en relación con mi participación en el estudio.

Soy consciente de que la información que ya se recopiló seguirá utilizándose y / o divulgándose como se describe en el formulario de consentimiento y autorización de la investigación, que firmé al inscribirme en el estudio.

En este punto, además de finalizar la participación en el estudio, me gustaría:

( ) Retirar del estudio y revocar la autorización

Revoco mi autorización para el uso y / o divulgación de mi información futura.

( ) Retirar del estudio, pero continuar con la autorización

Permito que el equipo de investigación continúe recopilando información de mis registros TELE.

Esto se haría solo cuando fuera necesario para apoyar los objetivos del estudio y no se usaría para fines distintos a los ya discutidos en el formulario de consentimiento y autorización de la investigación.

Entiendo que recibiré la confirmación de esta carta de retiro.

_____ _____
Firma del participante   Fecha

_____
Nombre impreso del participante del estudio

Opcional:

Estoy terminando mi participación en el estudio mencionado anteriormente porque:

Appendix 10: PROFESSORS FIRST TRIAL VERSION OF THE ESURVEY (English version).

Phase 1 STAFF QUESTIONNAIRE (Version 2, 18 August 2015)

This survey is part of a study of Internet use in Physical Education and is part of a PhD project. The survey is designed for staff from the Faculty of Physical Culture Sciences and aims understand staff feelings about using the Internet in class.

We would appreciate your honesty in your responses to gain an understanding of your thinking about online education in the area of Physical Education.

By completing this questionnaire you are consenting to us collecting this data from you.

Select the desired option. We would appreciate your comments in the questions that require you to enter your opinion. Thank you.

About You
Age (   )
Gender M (   ) F (   )
Title (LEF, medical, lawyer, etc.) _____

1. What is your definition of online education?

2. Have you taken any class, course or diploma, online or Internet supported?
No (   ) Yes (   )
Which one? _____
Please describe your experience, either positive or negative.

3. Have you given any Internet supported or online class, course or diploma?
No (   ) Yes (   ) which one? _____
Please describe your experience, either positive or negative?

4. Which of the following devices do you use or have been used:
Laptop (   ) PC (   ) tablet (   ) Other_____

5. Thinking about your interaction with your students, what does autonomy mean to you?
How do you promote autonomy in your class?

6. Thinking about your interaction with your students, what self-regulation mean to you?
How do you promote self-regulation in your class?

7. Do you consider that online education to be:
( ) As good as classroom education
( ) Better than classroom education
( ) Worse than classroom education
( ) I don't know / I have no idea

8. With all of the technical and educational aspects covered, do you believe that teaching online or with Internet support is equivalent to teaching in the classroom.
Yes ( ) No ( )
Why? _____

9. Is your class theoretically and/or practically based?
Theoretical ( ) Practice ( ) More theoretical than practical ( )
More practical than theoretical ( )   50% theory & 50% practice ( )

10. Do you consider that the Bachelor of PE could be taught?:
( ) entirely online
( ) with some online support
( ) is too practical to be taught online or Internet supported.
( ) just the theoretical subjects can be imparted online.
( ) just some practical subjects can be imparted online.

11. Do you think your subject could be taught online?
Yes ( ) No ( ) **Why?** _____

12. If you were offered the option to teach your subject(s) online, would you?
I would do it for sure ( ) I would not accept ( ) **Why?** _____

13. What are your actual subjects?
LEF:
_____
LMH:
_____

14. What do you believe are some disadvantages to teaching online? Select as many options as needed.
( ) teaching the contents
( ) evaluating the contents
( ) lack of appropriate pedagogical training to teaching online
( ) lack of technical support (platforms, software and specific applications for my class)
( ) unwillingness of the students
( ) unwillingness of faculty staff
( ) other _____

15. If you were offered training and technical support, would you teach your subject online?
(   ) Yes
(   ) Not sure, I would have to think about it
(   ) No
Why?_____

16. What platform would you prefer to teach an online class? Select as many options as you need.
(   ) Using the official site of the University (Moodle)
(   ) Using an unofficial site as Google docs
(   ) Using a social network, such as Facebook
(   ) Using another social network, which one? _____
(   ) I don't use social networks.

Finally, if you would like to attend the meetings about physical education online and participate in future stages of this research, please provide your contact details (phone or e-mail)_____

Thank you.

Appendix 10a: PROFESSORS FIRST TRIAL VERSION OF THE ESURVEY (Spanish version).

Esta encuesta es parte de un estudio sobre el uso de Internet en Educación Física y es parte de un proyecto de doctorado. La encuesta está diseñada para el personal de la Facultad de Ciencias de la Cultura Física y tiene como objetivo comprender los sentimientos del personal sobre el uso de Internet en clase.

Agradeceríamos su honestidad en sus respuestas para comprender su pensamiento sobre la educación en línea en el área de Educación Física.

Al completar este cuestionario, nos autoriza a recopilar esta información de usted.

Seleccione la opción deseada. Agradeceríamos sus comentarios en las preguntas que requieren que ingrese su opinión. Gracias.

Edad (   ) Género M (   )   F (   )   Titulo (LEF, Contador, etc.)_____

1. ¿Qué entiende por educación online o virtual?

2. ¿Ha tomado alguna clase, curso, diplomado, taller por internet o con apoyo de Internet?

No (   )   Si (   ) ¿cuál? _____
Describa por favor cómo fue su experiencia, ya sea positiva o negativa?

3. ¿Ha impartido alguna clase, curso, diplomado, taller por internet o con apoyo de Internet?

No (   )   Si (   ) ¿cuál? _____
¿Describa por favor cómo fue su experiencia, ya sea positiva o negativa?

4. Cuál de los siguientes aparatos ha usado o utiliza:

Lap top(   ) PC (   ) Tablet (   )Otro_____

5. Respecto a la interacción con los alumnos, ¿Que es para usted autonomía? ¿Cómo la fomenta en su clase?

6. Que es para usted autorregulación?-como la fomenta en su clase?

7. Considera que la educación por internet o con apoyo de Internet es:

A(   )Igual de buena como la del salón de clases
B(   )Mejor que la del salón de clases

C( )Peor que la del salón de clases

8. Si todos los aspectos técnicos y pedagógicos se cubren, considera que enseñar en Internet o con apoyo de Internet, sería igual como en el salón.

Si( ) No( )

¿Porqué?_____

9. La clase que imparte es:

Teórica ( )   Práctica ( )   Más teórica que práctica ( ) Más práctica que teórica( )
50%Teoría 50%práctica ( )

10.Considera que las carreras de la FCCF:

A( )Pueden impartirse totalmente por Internet
B( ) Pueden impartirse con algo de apoyo de Internet
C( )Son demasiado prácticas para impartirse por internet o con apoyo de Internet.
D( )Pueden impartirse solo algunas materias teóricas.
E( )Pueden impartirse solo algunas materias prácticas.

11. ¿Considera que su materia es posible diseñarla para impartirla por Internet o con apoyo de Internet?
Si ( ) No ( ) **¿Por qué?**

12. Si se le ofrece la opción de impartir sus(s) materia(s) por internet o con apoyo de Internet.
La impartiría sin duda ( )   No la impartiría ( ) **¿Por qué?**_____

13. Que materias imparte:

- LEF:_____

- LMH:_____

14. Seleccione tantas opciones como desee. ¿Cuáles son las principales dificultades que considera para impartir clases online?
A( )Enseñar los contenidos
B( )Evaluar los contenidos
C( )Falta de capacitación pedagógica apropiada para impartir clases online o virtuales
D( )Falta de apoyo técnico (plataformas, software y aplicaciones específicas para mi materia)
E( )Falta de Disposición de los alumnos
F( )Falta de Disposición de los directivos
D( )
Otra _____

15. Si se le ofrecieran la capacitación y el apoyo técnico correspondiente, ¿impartiría su materia por Internet?

A(   )La impartiría sin duda

B(   )No estoy seguro, tendría que pensarlo un poco

C(   )No la impartiría, **¿Por qué?**

16. Seleccione tantas opciones como desee: Donde le gustaría más impartir una clase por Internet:

A(   )En un sitio oficial de la Universidad como Moodle

B (   ) En un sitio no oficial como Google docs

C (   ) En una red social como Facebook

D (   ) En otra red social, ¿cuál?_____

E (   ) No uso redes sociales.

Si desea participar en reuniones sobre educación online en educación física, y en la futura investigación que realizaremos, por favor escriba su Teléfono y/o e-mail:_____

Gracias .

Appendix 11: STUDENTS FIRST TRIAL VERSION OF THE ESURVEY (English version).

Phase 1 STUDENT QUESTIONNAIRE (Version 2, 18 August 2015)

This survey is part of a study of Internet use in Physical Education and is part of a PhD project. The survey is designed for students from the Faculty of Physical Culture and aims understand your feelings about using the Internet in class.

We would appreciate your honesty in your responses to gain an understanding of your thinking about online education in the area of Physical Education.

By completing this questionnaire you are consenting to us collecting this data from you.

Select the desired option. We would appreciate your comments in the questions that require you to enter your opinion. Thank you.

About you
Age (   )
Semester (   )
Gender F (   ) M (   )

1. Do you have Internet access outside of school?
Yes (   ) No (   )

2. Which of the following electronic devices are you using or have used:
laptop (   ) PC (   ) tablet (   ) Other _____

3. What does online education mean to you?

4. Have you taken any class, course or diploma, fully online?
No (   ) Yes (   ) which one? _____

5. Have you taken any class, course, diploma or workshop that involved an Internet system to send jobs, assignments and receive grades or support? (not including Hotmail or Facebook)
No (   ) Yes (   ) which one? _____

6. Where do you find it easier to learn: on the Internet or in the classroom?
Internet (   ) classroom (   )

7. Do you consider online education to be:
( ) As good as classroom education
( ) Better than classroom education
( ) Worse than classroom education
( ) I don't know / I have no idea

8. Do you think that the Bachelor of PE could be taught?:
( ) entirely online
( ) with some online support
( ) is too practical to be taught online or Internet support.
( ) just the theoretical subjects can be taught online.
(   ) just some practical subjects can be taught online.

9. If you were offered the option to take a subject or some subjects online (without attending school) would you:
( ) Accept
( ) Accept only for theoretical subjects
( ) Accept only for practical subjects
( ) Not accept.
Why?_____

10. Do you think that an online or virtual classroom could cover practical components of a Bachelor of PE as effectively as in the classroom?
Yes ( ) No ( )
Why?_____

11. If you could complete a practical subject in an online or virtual classroom, would you take it?
Yes ( ) No ( )
Why?_____

12. What platform would you prefer to take a class online?
( ) Using an official site of the University (Moodle)
( ) I have not used the University's Moodle
( ) Using a social network, such as Facebook
( ) Using another social network, which one? _____
( ) I don't use social networks.

13. What do you believe are some disadvantages to taking an online subject in the Bachelor of PE? Select as many options as needed.
( ) The student-teacher feedback is not the same as in the classroom.
( ) The student-student interaction is not the same as in the classroom.
( ) The practical part of the subjects would be affected.
( ) Other _____

14. Do you think a Physical Education teacher who studied online, would be as prepared as one teacher who studied subjects taught in the classroom?

Yes (   ) why? _____

No (   ) why? _____

FINALLY: If you would like to participate further in the research about online education in our faculty, please provide your contact details (phone or e-mail)

_____

Appendix 11a: STUDENTS FIRST TRIAL VERSION OF THE ESURVEY (Spanish version).

Esta encuesta es parte de un estudio sobre el uso de Internet en Educación Física y es parte de un proyecto de doctorado. La encuesta está diseñada para estudiantes de la Facultad de Cultura Física y pretende comprender sus sentimientos sobre el uso de Internet en clase.
Agradeceríamos su honestidad en sus respuestas para comprender su pensamiento sobre la educación en línea en el área de Educación Física.
Al completar este cuestionario, nos autoriza a recopilar esta información de usted.
Seleccione la opción deseada. Agradeceríamos sus comentarios en las preguntas que requieren que ingrese su opinión. Gracias.
Edad (   ) Semestre (   ) Sexo H (   ) M (   )
1. ¿Tienes acceso a Internet, fuera de la escuela? Si (   ) NO (   )

2. ¿Cuál de los siguientes aparatos has usado o utilizas: lap top (   ) PC (   )
Tablet (   ) Otro_____

3. ¿Qué entiendes por educación online o virtual?

4. ¿Has tomado alguna clase, curso, diplomado, taller totalmente por internet?
No (   ) Si (   ), ¿cuál?_____ _____ _____

5, ¿Has tomado alguna clase, curso, diploma o taller que implique un sistema de Internet para enviar trabajos, tareas y recibir calificaciones o apoyo? (sin incluir Hotmail o Facebook)
No (   ) Si (   ), ¿cuál?_____ _____ _____

6. ¿Dónde crees que sea más fácil aprender, por internet o en salón de clases?
 Internet (   ) Salón (   )

7. Crees que la educación adquirida con ayuda del Internet es,
A (   ) Mejor que la del salón de clases
B (   ) Igual de buena como la del salón de clases
C (   ) Peor que la del salón de clases

8. Crees que la carrera de licenciado en educación física,
A (   ) Puede tomarse totalmente por Internet
B (   ) Es demasiado práctica para tomarse por internet
C (   ) Pueden tomarse por Internet solo materias teóricas como filosofía y administración
D (   ) Pueden tomarse por Internet solo materias prácticas como gimnasia y futbol
E (   ) OTRA

 9. Si se te ofrece la opción de tomar la carrera o algunas materias por internet sin asistir a la escuela:
A (   ) La tomaría sin duda
B (   ) La tomaría si solo fueran materias teóricas
C (   ) La tomaría si fueran materias prácticas
D (   ) No la tomaría. ¿Por qué?

10, ¿Crees que una clase online o virtual puede asegurar trabajar la parte práctica como en el salón de clases? Si (   ) No (   ) ¿por qué?

11. Si una clase online o virtual te asegurará trabajar la parte práctica como en el salón de clases, ¿la tomarías? Si (   ) No (   ) ¿Por qué?

12. ¿Dónde preferirías tomar una clase por Internet?
A (   ) En un sitio oficial de la Universidad como Moodle
B (   ) No he utilizado el Moodle de la Universidad
C (   ) En una red social como Facebook
D (   ) En otra red social, ¿cuál?_____
E (   ) No uso redes sociales.

13. Seleccione tantas opciones como desee. ¿Cuáles serían algunas dificultades por las que no debería tomarse la carrera de LEF por internet?
A (   ) La retroalimentación alumno-maestro no es igual que en el salón.
B (   ) La interacción alumno-alumno no es igual que en el salón.
C (   ) La parte práctica de las materias se ve afectada.
D (   ) Otra, ¿cuál?_____

14. ¿Crees que un Licenciado en Educación Física que estudió por Internet, estará igual de preparado que uno egresado del salón de clases?
SI (   ) ¿Por qué?_____
No (   ) ¿Por qué?_____

FINALMENTE: Si deseas participar o recibir información sobre una investigación sobre educación online en nuestra facultad, anota tu teléfono o e-mail para contactarte.
Gracias

Appendix 12: MOODLE PLATFORM'S TRIAL VERSION.

Appendix 13: DESIGN PRINCIPLES (DPS) USED DURING THE STUDY.

a) Some ideas presented to professors and students regarding DPs in Phase One's meetings. Based on Oliver (1999) and Oliver and Herrington (2000): Design and development of web materials and new technologies.

- **Contexts must be useful for learning**: Context reflect the ways how learning is going to be used in real-life settings. Students practice gymnastics' movements on professional gymnastics' apparatus and not just with peers but with kids in real settings.
- **Present learning activities about the content**: Class activities must be not just about memorizing a concept, or a way to teach a movement, instead, students must try to find new ways to teach and deliver content -knowledge- first to their peers and then to the possible kids.
- **Utilize open-ended tasks or without "structure"**: The final aim is teaching a movement. How to do that aim depends on students. They can work in the best possible way that they consider: in the faculty's installations or at home; with friends or with kids; and can change on the way to do that if needed.
- **Provide enough resources:** Students must have access not just to literature and professor's guide, but the possibility to work at home, school, online or in their real-life place of practice (e.g. primary school).
- **Provide support for learning**: Students receive mostly support by the online platform, however, could access classroom classes, if needed; along with the electronic support on personal devices (e.g. WhatsApp group)
- **Use authentic assessment tasks**: Again, real-life context must be the base for assessments. Students must be evaluated in activities and context where they act everyday (e.g. school of practice).

Because of the faculty little online experience, we worked with already utilized online DP
• Hence UACH's experts adequate with the already used DP's.
DPs from our own faculty or from CECAD:
1. It is feasible to work this subject online?
2. Students must have a system for self-regulation.
3. They will decide several ways to teach or work a task, based on their skills (**competence**)
4. Student's contributions will be taken into consideration (**relatedness**)
5. Students will be allowed to try new ways to reach the goals (**autonomy**).
6. The program will be a line of steps. Each aimed at achieving the subject goal.
7. The "tests" will be projects to complete.
8. Teaching strategies should reflect teaching staff philosophy. They should be congruent with that philosophy and capitalize on the strengths of the instructor.
9. Effective strategies assist learners in Achieving learning goals and Objectives.

Appendix 14: SCHEDULE (English version).

1-How many days do you think to need in order to complete this task?

Please indicate a probable delivery date (which is just an idea and you can modify that date as much as you need). DAY: _____ WEEKS: _____

2-Please indicate any means or program/software that you see appropriate to do it (word, power point, OTHER)

3- Do you feel you need extra help to make it; use of the Moodle system, using Word or PowerPoint; any other package or some other support?

Yes___ No___ Which?

4. If there is a potential problem for not terminate this activity, what could it be?

5. Do you consider necessary to receive a message from the teacher (system) before the deadline expires?

No_____ Yes_____ How long before?

SELF-REGULATION PROCESS
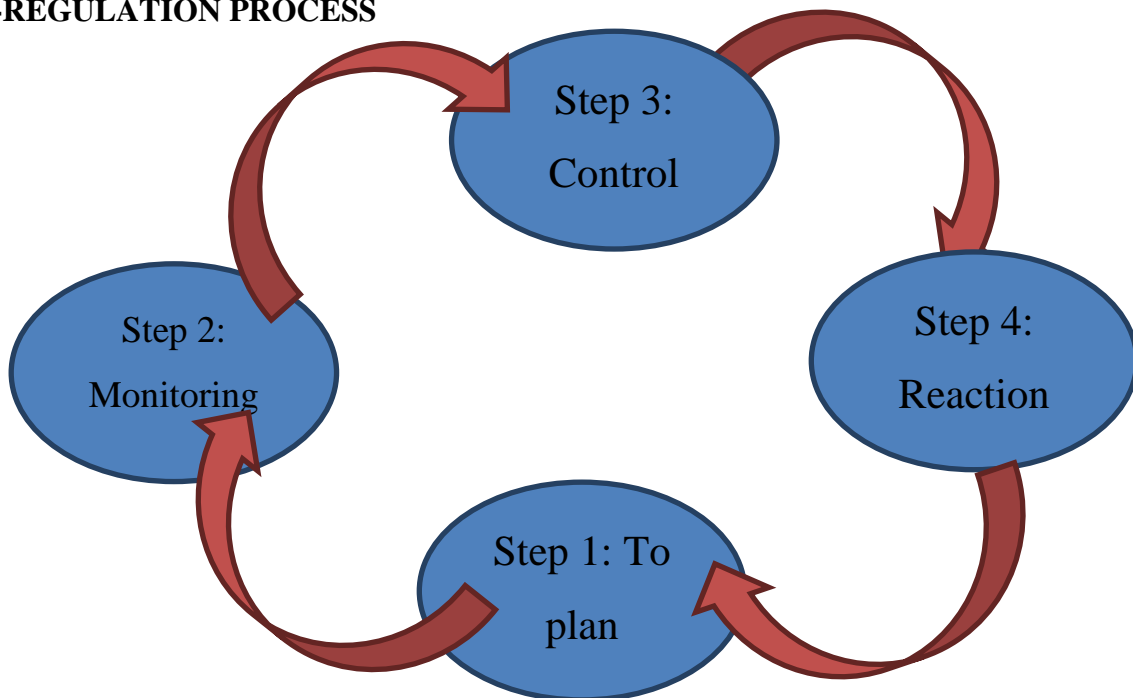
Appendix 14a: SCHEDULE (Spanish version).

1-¿cuantos días consideras necesitar aproximadamente para terminar esta tarea?

Indica un día probable de entrega (el cual es solo una idea y podrás modificarlo tanto como

necesites). DIAS:_____   SEMANAS:_____

2-Por favor, indica algún medio o programa que te parezca adecuado para realizarla (Word,

power point, OTRO)

3- ¿Consideras que necesites ayuda extra para hacerla; uso de la página, uso de Word o power

point o algún otro paquete o algún otro apoyo?

No____ Si____ ¿Cuál?

4.- De existir un posible problema para realizar o terminar esta actividad, ¿cuál podría ser?

5.- ¿consideras necesario recibir un mensaje por parte del docente (sistema) antes de que se

venza el plazo de entrega?

No_____ Si_____ ¿Cuánto tiempo antes?

PROCESO DE AUTORREGULACIÓN

Appendix 15: LIST OF STUDY'S EMERGING THEMES.

Phase One. List of emerging themes coming from questionnaires, focus groups and personal interviews. Most themes keep the original words as quoted for the participants.

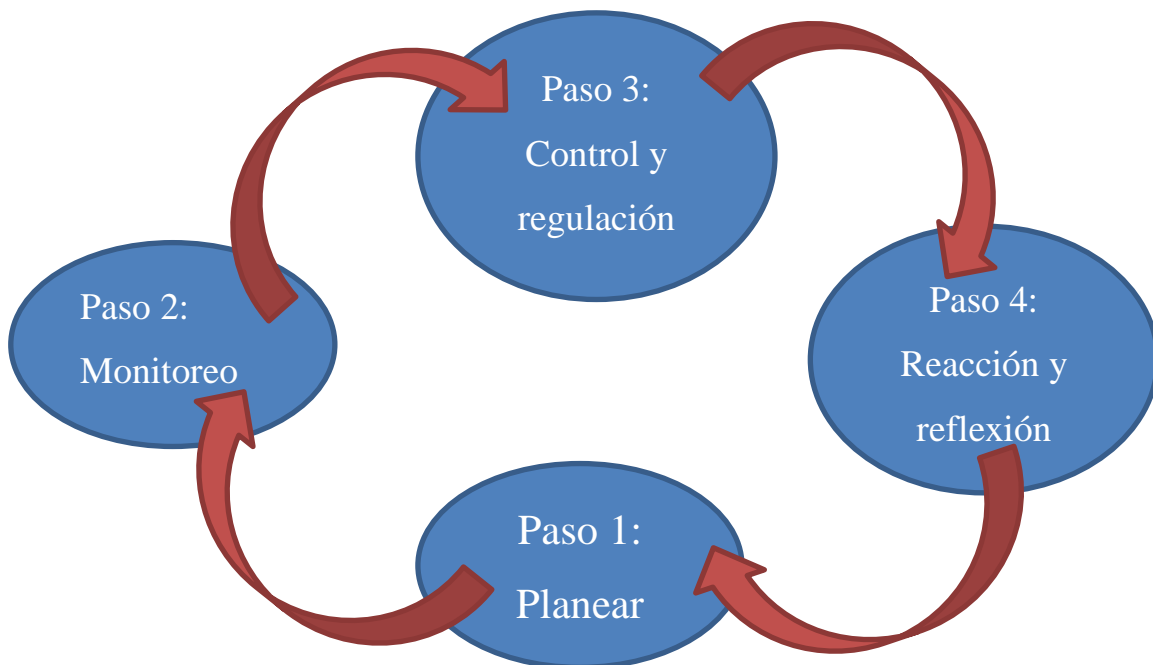| THEME: Paradigms about using a TELE	
Idea	Explanation
About the faculty's goal	Professors seem not to be clear about the Faculty's goal: "Basically, in the bi-annual academy we make changes to the programs, because the sport is always changing, the rules changes, and so we must be at day with the information" (Faculty Staff A, Interview, Phase One). The Faculty's goal is not to create a sport's coach, but Physical Education Professors.
As for the practical part	Professors and students have the idea that "Using a TELE will take away the practical part of the PETE" (Professor A, Interview, Phase One).
As for the evaluation part (Feedback/corrections /supervision)	"I see difficult for a teacher to evaluate using a platform because is not functional" (Professor A, Interview, Phase One).
As for the motivational part, not social/human interaction	"As a student, I will get a little scared because we are accustomed to the face to face class" (Professor C, Interview, Phase Two).
Fear to change/comfort zone/uncertainty/self-efficacy	63% of the students (41) in that study will choose not to go online if they have the opportunity. "Maybe we (as students) need other students around-as in the classroom-" (Student A, Interview Phase One).

THEME: Different points of view about the same factor	
Idea	Explanation
Using technologies in a PETE	For some professors students are so into technology and Internet that is just a matter of using it right away: "Students –already- use Facebook and social networks; let's use it for educational purpose" (Professor E, Focus Group, Phase One). However, students believe that social networks are a distracter and must not be used for academic purposes: "In Facebook we are looking at postings, status updates or images, and that will be a distraction" (Student B, Focus group, Phase One)
Face to face interaction in a TELE in PE	Professors believe that the face-to-face interaction is important and will suffer in a TELE: "I don't believe that -using a TELE in a PETE- could be as effective as the face to face one" (Faculty Staff A, Interview, Phase One). However, students even before they knew about the TELE have a different opinion: "face-to-face interaction is no longer a necessity, is better to receive real time feedback -even if is via video- vs. weekly in the classroom" (Student E, Focus Group, Phase One).
Teaching/learning in the traditional way	For some professors: "Students still needs to be under the professors' guide" (Professor E, Focus Group, Phase One). However, students think different about it and the opportunity of choice: "The school is not giving us enough freedom to act" (Student A, Interview, Phase One).
THEME: Limited awareness about University's technology.	
Idea	Explanation
Not using the official technologies: Moodle	Most students from the questionnaire and focus groups said that they have not used the technological supported system of the University (Moodle). Researcher: Have you been used Moodle?

	Student one: "I don't, but I mark it in the survey because is from the faculty and I believe that must be safer to use". (Student A, Interview, Phase One).
Not using the official technologies: Apps	For most of the professors in this study, the situation is similar: "I want to create Apps, for my subject, but, is a problem because of my ignorance about the University's process to create and incorporate those Apps" (Expert #5, Interview, Phase One).

THEME: Lack of technology for using a TELE	
Idea	Explanation
Lack of technology for using a TELE	Students stated the importance of a fast and reliable access to the Internet in order to use a TELE in a successful way: "Is more complex to upload videos and charge apps –in the school- the Internet is slow" (Professor E, Focus Group, Phase One). Professors agree when said that " Here [Faculty] we do not have virtual education; we are behind about it" (Professor B, Focus Group, Phase One).

THEME: Self-regulation	
Idea	Explanation
Motivation to Self-regulate	Both professors and students have little idea about Self-regulation: "Is not possible in my class". (Professors, Questionnaire, Phase One). For students: "We are not interested, except but some subjects" (Student D, Focus Group, Phase One).

THEME: Peer to Peer review	
Idea	Explanation
Peer to Peer review as a factor for successful online education.	Some students in this study consider peer-to-peer review an important factor in the educative process; especially for online education and when in doubt they could prefer to ask to peer instead that professor: "We as students sometimes have doubts that we are solving among us. Not all the information is on Internet and if so, sometimes we do not understand it" (Student G, Focus Group, Phase Two).

264

THEME: Free time	
Idea	Explanation
Students may face free time as a help or as an issue	Students in the survey said that online education could be a good help because could be "easily to adjust free time" (Student E, Interview, Phase One). However, for others is clear that is not so easy: "If I use this system [TELE] I will not know what to do with the free [between the classes] hour" (Student, Personal Communication, 2015).
THEME: Limited awareness of autonomy, self-regulation and self-determination	
Idea	Explanation
Professors and students said that they have no idea about what is SR or SD.	"I haven't listened to that word–SR- before". "I don't understand Self-regulation, how to work it with a student" (Professor A, Interview, Phase One).
THEME: Design of programs that goes against the University's academic model.	
Idea	Explanation
Faculty's programs are not following the University Academic Model.	Professors in this study recognize that their programs are not specifically designed to developing Self-regulation or Autonomy in the students; even when that goes against the University's academic model. "The programs are made in a collegiate way only to fulfil the requirements; the content is used but the strategies changes". (Professor G, Interview, Phase One).
THEME: Subjects' programs goal	
Idea	Explanation
Professors cannot continue working with the same goals and tasks.	The mere possibility of working with a TELE in the PETE's program, made to the professors be aware that they cannot continue working with the same goals and tasks: "I will need training about the platform and research about it, to redesign our program" (Faculty Staff A, Interview, Phase One). "By

	then, watching this program, we will have to modify the goal, right? (Professor C, Focus Group, Phase One).

THEME: Organizational culture.	
Idea	Explanation
For the right implementation of a TELE, we must be aware of the faculty's organizational culture.	Organizational culture impact for good or bad in all organizations: "In our faculty impacts negatively due to the ignorance and comfort zone where most of the teachers are". In addition, "the people directing the Faculty does not know about that (ignorance and comfort zone) or neither are interested in developing (Expert #4, Interview, Phase One).

THEME: Self-efficacy.	
Idea	Explanation
Both professors and students feel as self-efficacy about using a TELE.	85% of professors (56) and at least half of the students (33) in this study consider the real possibility of using a TELE; even when at first, they do not consider that system as a 100% feasible to use it in a PETE's program.

THEME: Humanism.	
Idea	Explanation
For some professors, the idea of online education goes against their personal view of education and humanism.	"PE is an area about working with people, how to virtualize that? and; "I choose Physical Education because of the directly work with people, that humanistic part is different from the others, using a TELE can take out that humanism" (Professor A, Interview, Phase One).

THEME: Opportunity's areas.
Explanation
Some professors identify some issues to work with a TELE in a PETE (e.g., capacitating to use technology) as a chance to work in the opportunity's areas of the Faculty: "I believe that we need as a Faculty, our own process of institutional capacitating for the PE's area. Yes, the University has one; but no specifically for our area. The University's courses are generics" (Expert #4, Interview, Phase One).

THEME: Difficulties.	
Both students and professors made a list of possible difficulties to the effective implementation of a TELE in a PETE program.	
Students:	Professors:
Accessing technologies (internet)	•Fear of change. •Students' maturity. •The human relationship will suffer. •We will need more communication professors-student-administrative staff. •Teacher's availability -24/7- •Evidencing the learning Capacitating to use that technology. •Access to technologies •Students' Self-regulation. They do not know how to self-regulate. Poor Instructional Design: •Our students are visual, auditory and mostly kinaesthetic.

THEME: Inherent risk of gymnastic exercises.	
Idea	Explanation
The inherent risk of gymnastic exercises is a factor named in the surveys by the professors.	"It is important the supervision in other groups of risk", How can you control it via online? Because here in school we have accidents when students are trying to do something too much difficult for them, so, how much can you reduce the complexity of the exercises for an online environment? ((Expert #4, Interview, Phase Four).

THEME: Future research.
Explanation
From this Phase One, we have some proposals from the expert group to work about online physical education, as future research or maybe sub-products of that study: "Search for any application, theoretical supported concepts or references about Pedagogy, Methodology, and Didactics of the virtual physical culture; also, for sport and adapted sports" ((Expert #3, Interview, Phase One).

Phase Two. List of emerging themes from focus groups and personal interviews. Most themes keep the original words as quoted for the participants.

Students' experiences working with the TELE.

THEME: *Possibility of change*	
Idea	*Explanation*
Students' possibility to make changes.	The fear of students to change was reflected in their contrasting acts; they said to feel motivated by having the opportunity of choice: "Cool, seems as that we are going to be the first to do that" (Student A, Focus Group Phase Two); however, they do not make changes to the TELE.
THEME: *Grades*	
Idea	*Explanation*
Changing the traditional qualification scale.	One important issue stated at the beginning of Phase Two was the change from the traditional qualification of the tasks. We change it from a numerical grade (e.g., 1 to 10) to, no satisfactory/ satisfactory/more than expected. In that way, the students can resend the tasks, covering the observations from the professor and, with that the stress by expecting grades could be lower (Schinske & Tanner, 2014)
THEME: **Motivation about using the TELE.**	
Idea	*Explanation*
Students did not feel motivated enough to self-regulate.	Students said that school gives all the tasks to do, with the professor so in charge of the process: "in the classroom, the professor is always asking for the tasks" (Student F, Focus Group, Phase Two). They also stated that a TELE could change that, because could give to them the real possibility of choice and be more in charge of their educative process: "For me is the same – choosing or not- but still, I prefer to be able to choose some things in the class" (Student G, Focus Group, Phase Two).

THEME: Choice as a possibility: Fear to commitment.	
Idea	*Explanation*
Students show mixed emotions about choice.	Students expressed mixed worries about the possibility of choice: "For some tasks, sometimes is good that the professors set the date to deliver; but in others I will like to set my own times"; (Student I, Interview, Phase Two).

THEME: Not working in the Faculty's Moodle.	
Idea	*Explanation*
Using the Moodle system is not common.	All the first semester's students use the Moodle system in at least two subjects: English and TYMI; that is why should not be something so rare for them. However, students said that they use it only in University subjects as "English, and Technologies, but was a bit different" (Student A, Interview, Phase Two).

THEME: Impact of working in a TELE in the traditional view of the physical education's teacher.	
Idea	*Explanation*
Tele as a helping tool in a PETE.	Students facing the TELE for the first time feel positive about it: "Before, the PE's teacher was like, just the PE's teacher. Now all is changing with the technology. They not even have notebooks, before were just practice and practice. Now they could have theory and even technology" (Student A, Focus Group, Phase Two).

THEME: Exams.	
Idea	*Explanation*
Doubts about taking exams in a TELE.	There are some specific factors as the exams, which still appear as issues: "I have a doubt, the exams will be virtual also? (Professor D, Focus Group, Phase One)

THEME: Delivering tasks.	
Idea	*Explanation*
TELE's impact in how students send the tasks.	Something that calls my attention was the question of one student: "May I send first task two, and then task one?" (Student A, Focus Group, Phase Two). That could seem as something trivial, but the real possibility of choosing the way how to interactuate with an online system is one of the main characteristics praised for some researchers (Wise, Bolls, Schaefer, 2008).

THEME: Fighting a traditional system of semestral schedules.	
Idea	*Explanation*
Students' concern about using a not traditional schedules system.	Even when students show mostly positive reviews about using the TELE, they still show that be in charge of their own educative process and with that fight against "a firm high school style –of learning- with a different way to receive the classes" (Professor A, Interview, Phase One) is a real concern.

THEME: Working a TELE in a PETE program.
Explanation
From Phase One to Phase Two, the *theoretical design* of the project (e.g., use of SRL and SDT with a DBR approach to research) keeps as a feasible one for the students; especially once that they worked in the real system.

THEME: Possible technical issues.
Just one doubt come from students about using the system: "What about [technical] problems with the website, who should we call?" (Student G, Focus Group, Phase Two).

Professors' experiences working with the TELE.

THEME: Expected changes vs. changes made.	
Idea	*Explanation*
Professors expected to students to make some changes in the TELE.	However, students did not change anything and just show concerns about being in charge of a big part of the educative process.

THEME: Professors' feelings about that project.	
Idea	*Explanation*
Professors feels both concerned and positives about it.	Professors' comments were mostly positives: "I believe that they will adapt well. They are so open to the technology and I believe that they have enough capacity" (Professor D, Interview, Phase Two). However, others show real concerns: "I believe that the most, are going to be overconfident; 'there is not assistance list, well, I will not go –work-'; 'there is not a final date to send it'; I really believe that they are going to struggle to match this change (Professor D, Interview, Phase Two).

Phase Three. List of emerging themes from students and professors' personal and quick interviews. Most themes keep the original words as quoted for the participants.

THEME: Beliefs of Self-efficacy and expected outcomes.	
Idea	*Explanation*
Students' answers seem to be based in what they *expected* to do and not with what they were really *doing*.	During the use of the Moodle platform students' answers about how do they feel the system were great, but seems to be based in their Self-efficacy beliefs and in what they expected to do and not with what they were really doing: No working at all: "with that of no time, I can made the works really good, searching for mistakes, without stress or pressure for having to send it in a specific date; and with that give more quality to the works" (Student H, Interview, Phase Three). That is: a big expected outcome made them believe that they could make it; even when they were not really able to do it.
THEME: Self-regulation schedule	
Idea	*Explanation*
Using the SR schedule: can help	Students seem to agree with the utility of using a schedule tool for Self-regulate, and not only for their academic life: "I feel that is more control.

271

you to be a better student?	In the long way you get accustomed to work with more control; and when you begin to work like that; you can have more control also in your everyday life" (Student H, Interview, Phase Three).
THEME: Social bias and lies.	
Idea	*Explanation*
Students seem to liar if needed in order to get social desirability.	Professors and students seem to show some kind of social desirability bias by answer in a more socially acceptable way (Kim & Kim, 2015) and sometimes even lying: "I lost the link of the platform" and "could be better for me to send it, if you wanted" (Student K, interview, Phase Three). For authors as Holm (1998) the point could be not if the students are cheating –lying-; but what students consider to be cheating?

THEME: Forgetting to self-regulate	
Idea	*Explanation*
Some students stated that did not work because they forgot to.	Students stated in the beginning of Phase Three that they could not forget about working in the system because will be always thinking about it: 'ah, the subject; I have work to do, every day" (Student H, Interview, Phase Three). However, from the quick interviews during Phase Three some students stated that did not work because they forgot to.
THEME: Asking for help	
Idea	*Explanation*
For some students in this study asking for help was something really hard to do.	In the end of this study just the students that finished the TELE, asked for help or bring advice about important could be to give more help to the students as deadlines and reminders closest to those deadlines.

THEME: Professors' social bias about students' expectations	
Idea	*Explanation*
Professors could be conducted with social bias about students' expectations?	Professors expected only good things about students' work in the TELE; and were sure that students could make it good in the TELE. Could be that professors answered that way just to show themselves as supporters of the students' expectations? Researchers as Gershensona, Holt and Papageorgec (2015) found "systematic biases in teachers' expectations for student attainment" (p.25) and indicates that this topic deserves attention in the future.

THEME: Having a Job and using the TELE.
Explanation
Having a Job was stated as a factor for not using the TELE because working was time consuming: "I feel it –using the TELE- as a great opportunity, but for me was not good because of my job" (Student J, Interview, Phase Three).

THEME: Procrastination.	
Idea	*Explanation*
Procrastination: Doing the work until the last moment.	One of the professors' main worries from previous phases was the possibility of students keeping with a repetitive behavior from the traditional classroom: to send the tasks close to the final dateline. In the end students acted just like this; delaying the delivering of the platform tasks until the last two weeks of the semester.

THEME: Feeling of reality in the TELE.	
Idea	*Explanation*
Do students feel the TELE as real?	Do students feel the TELE as real and not just one subject to be worked online? Students consider that the online subject (TELE) versus the classroom is almost the same. "Yes, I feel it real, the learning" (Student I, Interview, Phase Three).

THEME: Semester's length.	
Idea	*Explanation*
For some subjects students consider the semester to be too long.	What students said about the time needed to finish the TELE is not far from what some professors expressed in phases one and three: "two weeks, the process itself is short and easy to learn", "Easily with half of the semester" (Professor G, Interview, Phase One).

THEME: Working a TELE in a PETE program.
Participants agree that the system seems to be good enough to be worked. The theoretical design of the project (e.g., use of SRL and SDT with a DBR approach to research) show it as a feasibly one for the students and professors; even students who failed to use it, assume it as their fault because they have not time on this moment.

THEME: TELE as an academic stress reducer	
Idea	*Explanation*
Students stated the possibility of less academic stress by using the TELE.	Students stated that could be easier to work on the TELE, bringing more freedom to the academic process and possibly less stress "I feel more comfortable in a virtual class" "in the classroom, I will feel stress and hurried on" (Student J, interview, Phase Three).

THEME: Face to face interaction.	
Idea	*Explanation*
One main factor from the beginning of this study was the face to face interaction between students and professors.	As for one important aspect of the working with the TELE, the face to face interaction, students consider that "felt the same trust, I did not feel so much difference between here and the classroom. I feel more confident to ask to you or talk with you. I do not believe that there is much difference" (Student I, Interview, Phase Three).

THEME: Self-regulation only by convenience	
Idea	*Explanation*
Why students could manage their time by themselves?	In the end just two students were able to manage their time and working by themselves. Also, most of the reasons for that seems to be again, just the convenience of using the TELE; specially for those that live far away from the school, or work and study at the same time: "For me will be so much easy, because of the work and the distance; I live far away from the University, and comes here took me so much time" (Student I, Interview, Phase Three).

THEME: Possible technical issues.	
Idea	*Explanation*
How new technical issues appear during the *real* use of the TELE?	Students will confront new technical issues from the real use of the TELE as uploading videos not in the system but in an external site and using the schedule as a word file and not as a system's prompt also, not having a PC in home.

THEME: Peer to peer support.
From previous phases, to have support peer to peer was stated as an important component. However, after using the TELE in a practical way, some students consider than for an online subject, having to the other students around all the time could not be a main factor "is better to do it alone, because there are less distractions" (Student I, Interview, Phase Three).

THEME: Choosing in the academic life.	
Idea	*Explanation*
Could be a good idea to let students take subjects' academic decisions?	About the online subject, students consider that the idea about choosing from subject's aspects was great: "I really feel to have options" (Student K, interview, Phase Three).

THEME: Fear of commitment.	
Idea	*Explanation*
Some students keep around the TELE neither quitting nor working.	To researchers as Conroy, Willow and Metzler (2002) for them fear to commitment is a multifactorial issue and students seem to prefer to apparent in front of the professor as interested, not quitting at all; but delaying choice and commitment without thinking about the consequences.

THEME: Getting used to work in the TELE
Explanation
Overall, professors consider that students must get accustomed to using the TELE, especially because is a new way to work: "I think they are clueless" students are "very accustomed to receive instructions". Maybe they are still understanding and knowing how the system works" (Participant, interview Phase Three).

THEME: Lack of Time and Disposition to use personal times (outside school terms) for education.
Explanation
Students in previous phases consider using the TELE as a good strategy to "easily adjust free time" and "Maybe we can have better notes, because we could use better our free time" (Student E, Interview, Phase One). But professors always had reservations about students possibly lack of time management skill: "they will say: I do it later, but do not" (Professor D, Interview, Phase One).

THEME: Organizational culture.	
Idea	*Explanation*
The Faculty's organizational culture and their impact in students and professors work.	Absents and the professor's pressure for put qualifications are two factors of the Faculty's organizational culture affecting the work inside the Faculty; not just in the platform but in the classroom itself: "I will have the pressure –from the faculty's administrative staff- to put qualifications" (Professor I, Interview, Phase Three).

THEME: Issues for using a TELE: Time and work; and personal issues.
Explanation
Again, one main reason to not participate, even when always show interest, was the Time: "I could not accommodate the time to work in the platform. I thought that could have –time- but, no" (Student H, Interview, Phase Three). Students also agree that is not just a matter of having the TELE ready to use, but all the others personal factors (e.g., academic and every day's aspects) to be in order because "They would have to accommodate" (Student I, Interview, Phase Three).
THEME: The professor as a pressure figure.
Explanation
Students felt the TELE comfortable especially because "I did it, the class, in my time" and as for the professor putting pressure "was far more relaxed" (Student I, Interview, Phase Three).

Appendix 16: SUMMARY OF RESULTS FOR PROFESSORS' QUESTIONNAIRE FOR THOUGHTS ABOUT ONLINE EDUCATION IN A PETE.

Number of responses: 65	
Average age: 37.7 years.	
Age ranges	
30 a 39	24 (37%)
20 a 29	15 (23%)
50 a 59	11 (17%)
40 a 49	9 (14%)
60 a 70	2 (3%)
>70	0
<20	0
Did not answer	4 (6%)
Gender	
Male	34 (52%)
Female	29 (44%)
Did not answer	2 (3%)
Level	
Bachelor	44 (68%)
Postgraduate	15 (23%)
Did not answer	6 (9%)
Graduated from this Faculty	
Graduate from this Faculty	49 (75%)
Graduate from other Faculty	11 (17%)
Did not answer	6 (9%)

1.- Define online o virtual education.

Theme	Explanation	Number of responses
A virtual/Internet/distance mode class, using platforms and social networks	"A modality of distance and not presential education". "Learning via Internet". "Real time education via Internet". "Study via social networks".	30 (46%)
Electronic teaching	"A process of electronic teaching". "Create knowledge trough technology". "Take a subject in a platform with the professor's guide".	21 (32.3%)
Not student's presence	"Online education, not presential". "Education in a distance mode; that is without the student presence".	7 (11%)
Autonomous learning	"Learning in an autonomous way, using the ICTs". "Educative process in a more autonomous way, with the professor as a guide using technology".	2 (3%)
Others	"Very efficient in some areas". "To the distance, without attachments".	2 (3%)
Did not answer		2 (3%)

2.- ¿Which of the following technologies has used?

Technology	Number of responses
Laptop	65 (100%)
Social media	51 (78.5%)
PC	46 (70%)
Tablet	43 (66%)
Other technologies listed: data bases, dropbox, blackboard, virtual platform, television.	10 (15%)

3.- With regard to class work with their students:

What does autonomy mean to you?	
Themes	**Explanation**
Initiative/free will/ Independence/freedom	"Independence, initiative, self-efficacy". "Free will to act under my own criterion". "The students do not depending of the professor to learn". "Freedom to give the class". "Be able to make decisions in a free, informed and responsible way". "Total freedom".
Professor as a guide	"Being (as a professor) just a guide in any task".
Self-decision/government	"The student searching by themselves and not taking for granted what the professor says". "Not depending from anyone to do my professor duties but attending the faculty's rules". "The professor's decision about some aspects of their class: rules, materials, etc." "Find solutions with my own decisions".
Responsible, Self-learning, Self-efficacy	"Students making decisions by their own, and providing what they need for study". "Be self-sustainable and able to generate your own knowledge". "Generation of critical and analytic thinking

	using their own tools or abilities to solve problems".
A students and professors' faculty	"Student's faculty to do any change that he consider to finish a task". "Me giving my class under my own criteria and following the group's needs". "Professor and students working with methods and strategies under a personal point of view".

HOW DO YOU PROMOTE AUTONOMY IN YOUR CLASS?

"With the decision making".

"With task and reflexives lectures".

"Ideas' rain".

"Searching for information in the way that they choice to do it; but with the final goal of retaining that information".

"With the assignment of free to choose research's themes".

"With freedom of expression in the classroom".

"Taking decisions about the class as a group, and reaching a common agree".

"Making to the students responsible of their task".

"Being just a guide in any task".

PROFFESORS' OPINIONS NOT SO CLEAR ABOUT HOW TO PROMOTE AUTONOMY:

"Just a little".

"Not so much".

"With extra-class' works".

"Giving task with a predetermined time to finish".

"With different methods to make the learning easier".

"Every student must surpass themselves".

What does self-regulation mean to you?	
Themes	**Explanation**
Able to change	"Be able to change some personal aspects".
	"Student is able to modify the amount of work and learning rhythm".
Own control and regulation	"Be able to regulate myself".
	"Know how much you can do some things by yourself".
	"Having my own limits and know them".
	"Everyone know what must to do (needs-obligations)".
	"Having to implement the initiative of the person with critical interest to understanding the extent, applicable fair to the event".
	"Management of time, tasks and tools, by myself".
	"Schedules".
	"The person controls their own learning".
	"Synonymous of autonomy, control of their learning".
Control by others means	"Being putting in order".
DID NOT ANSWER	15 (23%)
HOW DO YOU PROMOTE SELF-REGULATION IN YOUR CLASS?	
"With goals to short and long term".	
"Evaluating the compromise, participation".	
"With feedback".	
"Self-evaluation, co-evaluation".	
"Asking to the student for personals proposals and projects".	
"Being just the class' guide; and students nurturing and developing the class".	
"Putting to the students in action-reflexion situations".	
"Giving to them different methods of teaching and learning".	
"No imposing my own norms to the students".	
"With problem solving and helping to reach the persons' wellness".	
"Giving the tools to that self-organization".	

4.- Where do you consider more feasible to teach an online class?

Official site (Moodle); Unofficial site (Google docs); Social Network (Facebook)

	Number of responses
Official site	27 (41.5%)
Official site + Unofficial site	9 (14%)
Official site + Social Network	7 (11)
Social Network	6 (9%)
Official site + Unofficial site + Social Network	6 (9%)
Unofficial site	5 (7.6%)
Unofficial site + Social Network	3 (4.6%)
Did not answer	2 (3%)

5.- Have you taken any class, course or diploma online or Internet supported?

	Number of responses
YES	48% (31)
NO	52% (34)
Was a positive experience because: **Time, practical and is a step forward.**	"Save time". "More options to me to impart my class". "Is the future, online subjects". "Is very practical".

Was a negative experience because: **Technological issues and lack of human interaction.**	"Complicated, we lost signal and content". "The information get saturated". "No feedback". "Lack of contact with the professor"

6.- Have you given any class, course or diploma, online or Internet supported?

	Number of responses
YES	18 (28%)
NO	45 (70%)
Was a positive experience because: **Enhances group dynamics, Supports students' personal learning process.**	"Positive and enriching". "Better communication and sharing of information with the group". "The students working at the same way and rhythm".
Could be a positive experience only if:	"Students are responsible".
Was a negative experience because: **Technical issues.**	"So much dependent of the internet's speed".

7.- Do you consider that quality of TOTALLY online education vs. traditional classroom education is:

	Number of responses
SAME	30 (46%)
WORSE	18 (27%)
I DO NOT KNOW	10 (15%)
BETTER	4 (6%)
Did not answer	3 (4.6%)

8.- Do you consider that quality of Education just internet SUPPORTED vs. traditional classroom education is:

	Number of responses
BETTER	28 (43%)
SAME	25 (38%)
WORSE	3 (4%)
I DO NOT KNOW	4 (6%)
Did not answer	5 (7.6%)

9.- If all the technical and educational aspects are covered, do you believe that teaching Physical Education TOTALLY Internet could be the same as in the classroom?

	Number of responses	Themes	Definition
YES	14 (21.5%)	Students' disposition and competences.	"If the student is competent, could be". "Yes, but only for some subjects".
		Enter the modernity.	"All can be adapted to the technological modernity". "Internet is just a complement".
NO	50 (77%)	Students' disposition and competences.	"Because no all the students are able to self-regulate, being autonomous". "Lack of learning transfer between students". "Some competences that cannot be cover by Internet".
		Practical part of the bachelor.	"Sport must be learned mostly in sport practices". "Lack of practical skills".

			"Lack of evidences from the field's work".
			the PE must be presential".
		Social interaction/human part.	"PE have a necessity of physical's practices".
			"I believe that in PE the interaction is a need".
			"The practice needs direct supervision".
			"Lack of the human part"
			"You work with persons and cannot afford to make a mistake"
		The professor as a unique component/not replaceable	"The professor cannot be expendable".
			"I consider very important the accompaniment of the professor in the specific context".
			"The professor's support must be there for some subjects".
		Feedback	"Delayed feedback".
			"You need the practice and correction of that practice".
			"Some practical aspects must been supervised; and is not possibly via Internet".
		Internet	"Internet as a distraction".
			"Some practical aspects must been supervised; and is not possibly via Internet".
Did not answer	1 (1.5%)		

10.- If all the technical and educational aspects are covered, do you believe that teaching Physical Education just SUPPORTED by Internet could be the same as in the classroom?

	Number of responses	Themes	Definition
YES	36 (55%)	Native digital	"Is of students' interest; they pass more time connected with technology".
		Enter the modernity.	"The support of the technologies is a necessity". "More opportunity of technology". "Developing competences about using technologies".
		Enhancing the educative process.	"All can be applied in the same way". "To reinforcement of some aspects of the teaching". "Means to capacitate to the professors". "Will be a help with the use of videos".
		Students' disposition and competences.	"Because of the students' capacity".
		Internet	"Because right now, Internet is a very important tool".
NO	22 (34%)	Practical part of the bachelor.	"My doubt is about the practical classes "Nothing can replace to the field's practice".
		Social interaction/human part.	"Lack of social interaction". "Needs a presential evaluation in some cases". "The classroom experiences are positives for the training".

		Feedback	"Lack of alive examples". "Needs a presential evaluation in some cases".
Did not answer	6 (9%)		
Did not understand the question	1 (1.5%)		

11.- Do you consider that the THEORETICAL subjects in the FCCF:

	Number of responses
Can be taught with some Internet's support	38 (58%)
Can be totally taught by Internet	27 (41%)

12.- Do you consider that the PRACTICAL subjects in the FCCF:

	Number of responses
Can be taught with some Internet's support	60 (90%)
Can be totally taught by Internet	2 (3%)
Did not answer	3 (4.6 %)

13.- Which kind of subject do you taught regularly?

* This item was simplified for this report from professors' original answers of NAMES of the subjects. I adjust it to the % of theory or practical for each subject. That is why this question show the same information that question 17.

	Number of responses from a total of 104 subjects named.
50% Theory/50% practical	37 (35.5%)
75% Theory	25 (24%)
100 % Theory	24 (23%)
75% practical	16 (15%)
100% practical	2 (2%)

14.- With the appropriate training and technical support Do you think that your subject is entirely possible to be taught TOTALLY by internet, or just SUPPORTED by Internet?

	Number of responses from a total of 104 named.
Just supported by Internet	79 (76%)
Totally	21 (20%)
Did not answer	3 (3%)
Not sure	1 (1%)

15. - Having the training and technical support, would you consider impart your subject entirely online?

	Number of responses from a total of 104 named.
Not sure, would have to think about it	56 (54%)
Yes	37 (36%)
No	11 (11%)

16. - Having the training and technical support, would you consider impart your subject just SUPPORTED by Internet?

	Number of responses from a total of 104 named.
Yes	91 (87.5%)
Not sure, would have to think	13 (12.5%)
No	0

17.- Please check the % that your subject is more practical than theoretical:

	Number of responses from a total of 104 subjects named.
50% Theory/50% practical	37 (35.5%)
75% Theory	25 (24%)
100 % Theory	24 (23%)
75% practical	16 (15%)
100% practical	2 (2%)

18.- Select as many options as desired. What do you consider as difficulties to teach online classes?

FACTOR	Number of responses choosing only one individual factor.
A) Teaching contents	1
B) Evaluate the contents	1
C) Lack of appropriate pedagogical training to teach online classes	1
D) Lack of technical support (platforms, software and specific applications to my subject)	2
E) Students' unwillingness	1
F) Directives' unwillingness	0
Total of professors choosing only one individual factor.	6 (9%)
Number of responses choosing at least two factors.	58 (90%)
Since professors could choice more than one option for this item, they made as much as 27 combinations with at least 2 factors. For a matter of clarity this item is developed in the results section.	

Appendix 17: SUMMARY OF RESULTS FOR STUDENTS' QUESTIONNAIRE FOR THOUGHTS ABOUT ONLINE EDUCATION IN A PETE.

Number of responses: 65	
Average age: 20.6 years.	
Age ranges	
20 a 25	35 (54%)
<20	27 (41.5%)
31 a 39	1 (1.5%)
>40	1 (1.5%)
26 a 30	0
Did not answer	1 (1.5%)
Gender	
Male	41 (63%)
Female	21 (32%)
Did not answer	3 (4.6%)
Semester	
2nd.	54 (83%)
3rd.	10 (15%)
Did not answer	1 (1.5%)

1.- Do you have Internet access, outside the faculty?

	Number of responses
YES	62 (95%)
NO	2 (3%)
Did not answer	1 (1.5%)

2.- ¿Which of the following technologies has used?

Technology	Number of responses
Only Laptop	22 (34%)
Only PC	7 (11%)

Only Tablet	0
Using all the three: Laptop + PC + Tablet	26 (40%)
Other technologies listed: Cellular	14 (14.5)

3.- What do you understand by online education?

Theme	Explanation	Number of responses
Not going to school.	"No need to be in the school". "Work in home" "Study outside the school in anytime".	11 (17%)
Class via PC/Internet/Virtual	"Education via Internet". "Class and send of works in a virtual way". "Teaching via Internet". "Class in a web page".	48 (74%)
Mass education	"Mass education very accessible".	1 (1.5%)
Time	"You can do your tasks with a limited (unlimited?) time	1 (1.5%)
Help for learning	"Very accessible tool and easier to learn".	1 (1.5%)
Did not answer		3 (4.6%)

4.- Where do you consider more feasible to teach an online class?

	Number of responses
Classroom	56 (86%)
Internet	4 (6%)
Both (Classroom and Internet)	3 (4.6%)
Did not answer	2 (3%)

5.- Have you taken any class, course or diploma, online or Internet supported?

	Number of responses
YES	20 (30%)
NO	45 (69%)
Was a positive experience because: Adaptable to my lifestyle	"I work from home". "I work in my free time". "Quicker than classroom".
Was a negative experience because: Internet distractions. Technological Issues. No Feedback. Lack of Self-regulation. Boring.	 "A lot of distractions in Internet". "Doubts about how to use the system". "No answers from the professor" "I did not send the works via e-mail, and fail". "Not hard, but boring".

6.- Have you taken any class, course that use a own system (no Hotmail or Facebook) to send the tasks, home works and receive grades?

	Number of responses
YES	42 (64%)
NO	21 (32%)
Did not answer	2 (3%)
Was a positive experience because: Adaptable to my lifestyle	"Sending works from home". "Sending works in a quicker way"
Was a negative experience because: Irrelevant Internet distractions. Technological Issues. No Feedback. Lack of Self-regulation. Boring.	 "Was irrelevant to me". "I did not feel as learning something" "Platform saturation and not support about it" "Not supervision" "Good, but hurry up because of time" "Ok, but some kind boring"

7. Do you consider that quality of TOTALLY online education vs. traditional classroom education is:

	Number of responses
SAME	22 (34%)
WORSE	21 (31%)
I DO NOT KNOW	20 (27%)
BETTER	1 (1.5)%
Did not answer	1 (1.5%)

8. Do you consider that quality of Education just Internet SUPPORTED vs. traditional classroom education is:

	Number of responses
BETTER	27 (41%)
SAME	22 (34%)
I DO NOT KNOW	10 (15%)
WORSE	4 (6%)
Did not answer	2 (3%)

9. .- If all the technical and educational aspects are covered, do you consider that the Physical Education bachelor TOTALLY imparted by Internet could be the same as in the classroom?

	Number of responses	Themes	Definition
YES	15 (23%)	Better help/support with Internet	"You could do the practical tasks in the same way as the classroom". "Could be the same learning". "Because of Internet's support to research". "Could be like being in the school". "Could be even more complete".
NO	50 (77%)	Students' will	"You did not put so much attention".

			"Work alone will be boring".
		Practical part of the bachelor.	"The bachelor is practical". "How will we learn the practical part?". "Not all could be 100% theory, we need the practice".
		Doubts and relationship professor-student.	"Nobody teach as a professor". "You must interact in classes". "No interaction professor-student".
		Internet Distractions	"Because of Internet's distractions".

10. If all the technical and educational aspects are covered, do you consider that Physical Education bachelor just SUPPORTED by Internet could be the same as in the classroom?

	Number of responses	Themes	Definition
YES/Maybe	36 (55%)	Helping tool	"Most aspects of the class will be easier". "There is a better mental development". "They is a complement". "Is better if you have trouble of time". "Because will be only a supporting tool".
NO	25 (38.5%)	Dynamics change.	"Is not the same dynamics". "The work in the real world is practical, not virtual".
		Lack of learning	"Could not be a correct teaching".
		Feedback	"Will not be a correct feedback".

		Relationship professor-student will suffer.	"There will be a lack of relationship professor-student".
BOTH	1 (1.5%)		
Did not answer	3 (4.6%)		

11. Do you consider that the THEORETICAL subjects in the FCCF:

	Number of responses
Can be taught with some Internet's support	43 (66%)
Can be totally taught by Internet	20 (30%)
Did not answer	2 (3%)

12. Do you consider that the PRACTICAL subjects in the FCCF:

	Number of responses
Can be taught with some Internet's support	62 (95%)
Can be totally taught by Internet	1 (1.5%)
Did not answer	2 (3%)

13. Do you think that an online class can ensure the practical part as in the classroom?

	Number of responses	
NO	55 (84.6%)	
YES/ Maybe	10 (15%)	
Reasons for NO		
Themes	Definition	Number of responses
Not realistic/lack of practical part	"We need real interaction with the professor and peers"	22 (34%)
Need for supervision	"Because nobody will be checking your progress".	14 (21.5)

	"You will do whatever you wanted". "Because nobody will oblige you like in the classroom".	
Lack of interaction Professor-Student; Peer to peer.	"Is not the same without the interaction with professors and peers". "In the classroom you interact more with peers and the professor".	8 (12%)
Lack of learning	"Is not the same learning"	3 (4.6%)
Lack of material	"We do not have material enough". "Will not be enough resources to do the practical tasks".	2 (3%)
Time	"Takes more time"	1 (1.5%)
Internet distracters	"There are many distracters in Internet"	1 (1.5%)
Reasons for YES		
Themes	Definition	Number of responses
Technological support	"With videos is not the same but similar to the classroom " "With the web and professor's support I can follow my advance"	3 (4.6%)

14. If an online class ensures you working the practical part as in the classroom, would you take it?

	Number of responses	
	Number of responses	
YES	35 (53%)	
NO	29 (45%)	
Did not answer	1 (1.5%)	
Reasons for YES		
Themes	Definition	Number of responses

Easier/ Simple	"More easier and simple for students from outside the city".	14 (21.5%)
	"Easier from home".	
	"Better to adjust to dates and free time".	
	"We will have time to work".	
	"To not come to the classroom".	
	"Will be the same".	
	"Will have more time".	
Curiosity	"To know how could be, will be interesting".	2 (3%)

Reasons for NO		
Themes	Definition	Number of responses
Lack of practical part	"Is not the same dynamic".	16 (25%)
	"I do not like it".	
	"Do not feel secure about how to do the exercises".	
	"I like more to work in the classroom".	
	"will not be the same".	
Lack of interest	"Will not get my attention".	5 (7.6%)
	"I do not like technology".	
	"Will not give the same importance".	
Lack of interaction Professor-Student; Peer to peer.	"Is not the same that with a professor".	4 (6%)
	"I need a professor to explain me with details".	
	"I will prefer to receive feedback in every moment".	
Ignorance/lack of information	"I do not know how is possible to take a practical class online".	2 (3%)
Lack of fun	"Because classroom is funnier and dynamic".	1 (1.5%)
Lack of learning	"Will not have the same knowledge and experience".	2 (3%)

	"The discussion is better -in a classroom-".

15. Where would you prefer to take a class online?

	Number of responses
In an official site of the University as Moodle	32 (49%)
I have not used the University Moodle	20 (30%)
In a social network like Facebook	7 (10%)
I do not use social networks	2 (3%)
On another social network	1 (1.5%)
Moodle + Facebook	2 (3%)
Moodle + Facebook, but I did not use Moodle	1 (1.5%)

16. What are some difficulties to take a PE's bachelor online?

Number of individual factors responses 22 (34%)	
A) The student-teacher feedback is not the same as in the classroom.	8 (12%)
B) The student-student interaction is not the same as in the classroom.	0
C) The practical part of the subjects could be affected.	11 (17%)
Did not answer	3 (4.6%)
Number of multiple factors' responses 43 (66%)	
(a+b) The student-teacher feedback and student-student interaction is not the same as in the classroom.	2 (3%)
(a+b+c) The student-teacher feedback, student-student interaction and the practical part of the subjects is not the same as in the classroom.	26 (40%)
(a+c) The student-teacher feedback and the practical part of the subjects is not the same as in the classroom.	11 (17%)
(b+c) The student-student interaction and the practical part of the subjects is not the same as in the classroom.	4 (6%)
Some others factors indicated by students	
Cheat	"False identities to present and approve tests"
Lack of experience	"Without practical we will have no experience".

Lack of fun	"There is not fun in doing it that way".
Internet distractions	"a lot of distractions in Internet".
Lack of interaction Professor-Student; Peer to peer.	"Will be not school coexistence".

17. Do you consider that a graduate of Physical Education who studied via Internet, will be equally prepared as a graduate from the traditional classroom?

	Number of responses
YES	8 (12%)
NO	57 (87.5%)

Reasons for YES	
Themes	**Definition**
Student willpower	"If the student get ready and work hard will make it". "Some students will make it even better than in the classroom".

Reasons for NO	
Themes	**Definition**
Occupational career issues/Experience	"Will not find work because have not experience". "Will have a lack of knowledge in practice and how to move in the job environment". "You need to live the tasks, not just watching them". "Because did not work in the practice way that we will work in the future".
Practical part	"Will not have the experience form the practical works".
Feedback	"Maybe did not have the direct contact with the professor". "Some doubts only can be resolved by the professor".
Interaction Professor-student.	"Is really needed the interaction with other students and professors". "In Internet there is not exist the interaction professor-student".
Different way of study/learn.	"Is not the same that be there, in person"

	"In the classroom there are practical examples".
Students willpower	"It all depends on the students' will power".
Lack of knowledge/learning	"The graduate from the classroom is better, more prepared". "Studying by Internet is not possible to move the body".

Appendix 18: RUBRIC FOR GYMNASTICS TASK (English version).

Evaluation of Human Structures (Pyramids)			
Criterion to evaluate	Guidelines	comments	score
Uniformity	The members of the human structures should be uniformed according to the theme raised in the presentation of the structures, giving meaning and personality to the presentation.		
Technique	The execution must be done with an adequate quality of movement in which the mastery of the movements can be easily appreciated, avoiding to the maximum to risk the physical integrity of the team members.		
Symmetry	The human structure must be a figure where the symmetry is perfectly appreciated and its shape is pleasant to the view of the spectators.		
Difficulty	The groups should consider challenges that demand a readable effort for the realization of the pyramids.		
Creativity	The development of ideas generated by the students must be unique and their own, avoiding the replication of ideas that match those of other groups.		

Appendix 18a: RUBRIC FOR GYMNASTICS TASK (Spanish version)

Evaluación de las estructuras Humanas			
Criterio a Evaluar	Lineamientos	Observaciones	Calificación
Uniformidad	Los integrantes de las estructuras humanas deberán de estar uniformados de acuerdo a la temática planteada en la presentación de las estructuras, dándole sentido y personalidad a la presentación.		
Técnica	La ejecución deberá de ser realizada con una calidad de movimientos adecuada en la que se pueda apreciar con facilidad el dominio de los movimientos, evitando al máximo el poner en riesgo la integridad física de los integrantes del equipo.		
Simetría	La estructura humana deberá de ser una figura en donde la simetría sea perfectamente apreciada y su forma sea agradable a la vista de los espectadores.		
Dificultad	Los grupos deberán de plantearse retos que demanden un esfuerzo legible para la realización de las pirámides.		
Creatividad	El desarrollo de ideas generadas por los alumnos deberán de ser únicas y propias, evitando replicar ideas que coincidan con a la de otros grupos.		

Appendix 19: RESEARCHER'S NOTES ABOUT EACH STUDENTS WORK IN THE TELE.

The official end of Phase Three was the semester's final day: November 27. Two students finished the TELE and after the professor's evaluation, they both approved the subject. In that final part of Phase Three some information was gathered via interviews about how they managed to work in the TELE. The main outcomes are presented below with a general overview of the interaction during the TELE for each student. Some of those outcomes are related to ones from previous phases.

Student 1 (Not Regular Student: NSR) This student was enrolled in the explanation's class and just work in the system that first day in August 28. He was always around going to all the meetings and responding to the messages; showing interest in the project. However, he did not work at all in the TELE.

Student 2(*Regular* Student: RS) This student was enrolled in the explanation's class in August 28. From the first interviews in Phase One I saw the interest and how he makes sound relationship between what we wanted to do in the project and how he works already in their academic life. He said to be a self-regulated person and from the interest shown in this project and the positive outcome, we can say that He is. From Him we can have an opinion of a successful participant using a TELE.

Student 3 (NRS) This student was enrolled in the explanation's class in September 1. And just log in one more day in October 6 to be the first student that sends any task. After that he never login again or answer the messages. In march 2016 I saw he active in Facebook and ask about why he just do not continue after sending the first task, and the answer give a clear idea about how some students are not ready to self-regulate or follow the self-regulation process of a TELE: "I did not give my own time and space to work the subject online" (Participant, Quick Interview, Phase Three).

Student 4: (RS) This student was a curious case because He did not get enrolled in any of the explanation's classes. He was enrolled by them in September 1, after asking permission to join the project. From the beginning and from their busy daily schedule; we could saw that He was somehow a self-regulated person. To note that all of my work with that student was actually

virtual; I never saw him face to face, only text messages and videos. From Him we can have an opinion of the other, only two students, with a successful participant using a TELE in this program.

Student 5 (NRS) Enrolled September 30: Login around the Moodle platform, not working at tasks. Did not finished. One of the students that keep on the entire project but never work in the TELE. He login but ask to drop out in the last week of the project; in some points during the project he lied about how was he working.

Student 6 (NRS) Accept to go into the Moodle platform just for an explanation, not work at all. Did not finished. This student was all the semester talking about how the lack of a PC was the main issue for using the TELE. However, never ask help about it. Even as late as November 18, still ask me to keep Her into the project. She really believed that have time to finish –from what the professor said about the length of the subject, He still have time to finish-.

Student 7 (NRS) Accept to go into the Moodle platform just for an explanation, not work at all. Did not finish. Never more asked the messages or reminders.
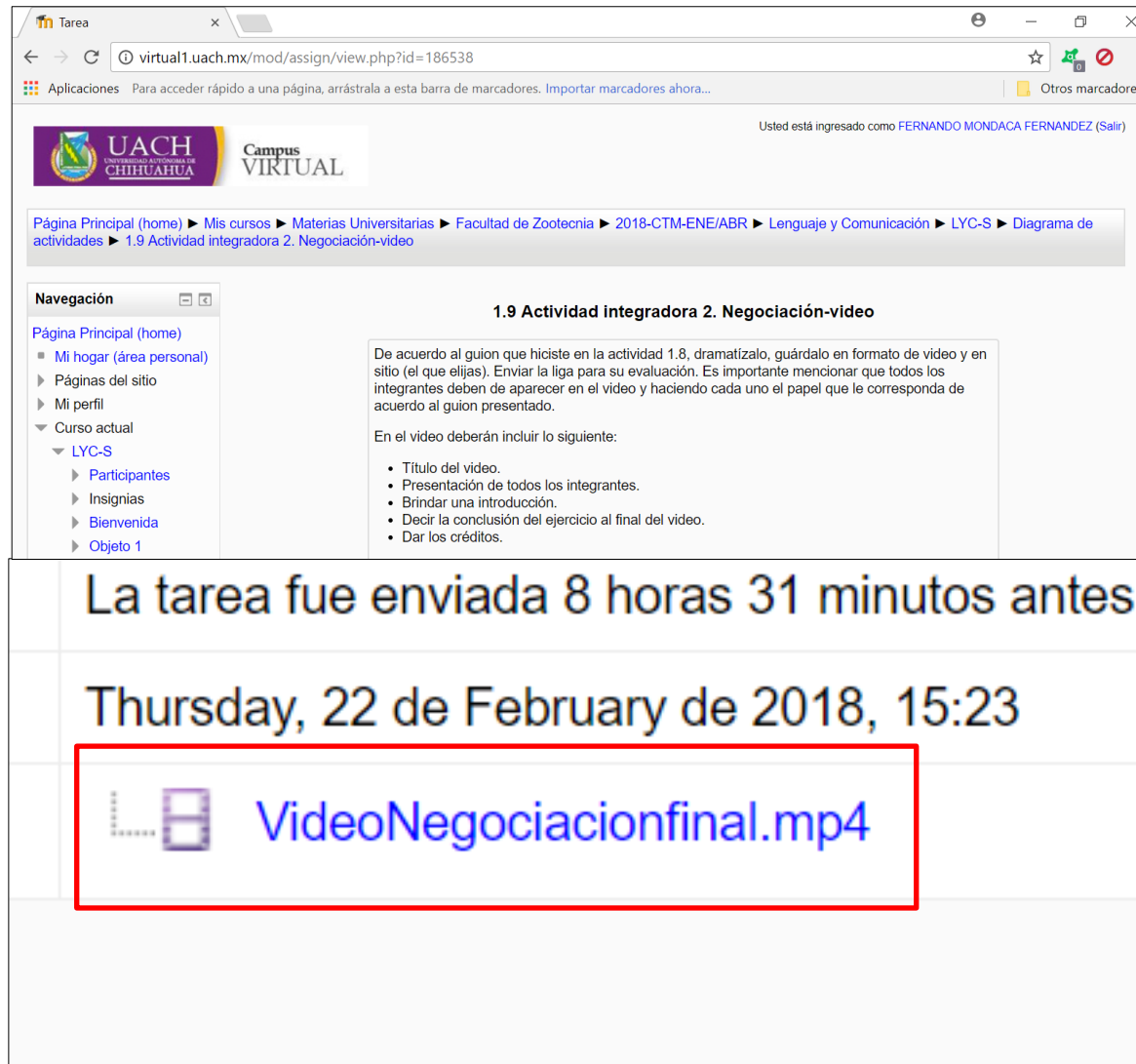
Student 8 (RS) Into Moodle platform just for explain it, no enrolment, but still go, August 28. Ask for dropping out in September 10: HE chooses to go into the classroom.

Student 9 (RS) Into Moodle platform just for explain it, no enrolment, but still go. In November 10 this student said that still wanted to stay in the project. However, in November 23 come to my office and ask for drop. But, with only one week to finish I leave it as part of the study; as a student that fail using the TELE.

Appendix 20: WEEKLY WORKING HOURS OFFICIALLY REQUIRED FOR THIS STUDY'S SUBJECT.

UNIVERSIDAD AUTÓNOMA DE CHIHUAHUA Clave: 08MSU0017H **FACULTAD DE EDUCACIÓN FÍSICA Y CIENCIAS DEL DEPORTE** **Clave:** PROGRAMA DEL CURSO: INICIACIÓN Y DIDÁCTICA DE LA GIMNASIA ARTÍSTICA. **TOTAL WEEKLY HOURS**	**DES:** SALUD
	Programa(s) Educativo(s): Lic. Educación Física
	Tipo de materia: Básica –Obligatoria
	Clave de la materia:
	Semestre: 2do
	Área en plan de estudios: Formación-Básica
	Créditos
	Total de horas por semana: **Total working hours by week:** **4**
	Teoría: 10
	Práctica 26
	Taller: 0
	Laboratorio: 26
	Trabajo extra clase: 4
	Total de horas semestre: 36
	Fecha de actualización: Agosto 2007

Appendix 21: AUCH'S MOODLE ALLOWING TO UPLOAD VIDEOS DIRECTLY TO THE PLATFORM.

Appendix 22: AUCH'S MOODLE KIND OF CHRONOLOGICAL CHART.

Tema	TASKS Tareas	DELIVERING DATE Fecha de entrega	DELIVERED Entrega	GRADE Calificación
Objeto 3	ELABORAR UNA MONOGRAFIA	Wednesday, 25 de April de 2018, 23:55	Sin entrega	-
Diagrama de actividades	1.3 Actividad de aplicación	Wednesday, 24 de January de 2018, 23:55	Enviado para calificar	8.50
	1.4 Actividad de aplicación	Wednesday, 24 de January de 2018, 23:55	Enviado para calificar	9.00
	1.6 Actividad integradora 1. Videos	Saturday, 3 de February de 2018, 23:55	Enviado para calificar	9.50
	1.8 Actividad de aplicación.	Thursday, 15 de February de 2018, 23:55	Enviado para calificar	9.00
	1.9 Actividad integradora 2. Negociación-video	Thursday, 22 de February de 2018, 23:55	Enviado para calificar	-
	2.3 Actividad de aplicación	Wednesday, 14 de March de 2018, 23:55	Sin entrega	-
	2.4 Actividad de aplicación	Sunday, 25 de March de 2018, 23:55	Sin entrega	-
	2.5 Actividad de aplicación	Saturday, 31 de March de 2018, 23:55	Sin entrega	-
	2.6 Actividad integradora 3	Thursday, 5 de April de 2018, 23:55	Sin entrega	-
	3.3 Actividad de aplicación	Wednesday, 18 de April de 2018, 23:55	Sin entrega	-
	3.6 Actividad de aplicación	Wednesday, 25 de April de 2018, 23:55	Sin entrega	-
	3.8 Actividad Integradora	Tuesday, 29 de May de 2018, 23:55	Sin entrega	-

Appendix 23: FINDINGS SENT TO THE EXPERT GROUP FOR A FINAL REVIEW (English version).

1.- What is the influence of a TELE on undergraduate Physical Education student's self-determined motivational responses (i.e., needs support and self-determination)?

    • Teachers and students think cheating or unethical work would be more likely to occur in such an autonomous environment such as online education.

    • Students do not seek help even when they are struggling and do not know how to manage their time.

    • Students lied about that they were working and had sent work (the online system allowed us to see that was not true).

    • Students indicate that the teacher is still a figure that makes them feel pressured. What do you think of that?

2.- **What is the influence of a TELE on undergraduate Physical Education student's Self-Regulated learning?**

    • 30% of teachers did not answer the question as supports autonomy and self-regulation of their students in class? And generally they responded: "I do not think I am promoting" and "in my class is not possible." What do you think of that?

    • Students say the school does not currently motivate to self-regulate; everything is given in advance: as homework, when deliver, etc.

    • 8 out of 10 students who used the online system, they said they did not have time to work on the system and could not complete the online material.

    • There are real concerns about the organizational culture of the faculty for example; students are concerned about the attendances / absences, even when they do the work and send them.

3.- **How do professors experience teaching in a technology enhanced learning environment designed for Physical Education teacher education?**

• For some teachers online education is against the humanist idea of the EF, the possibility of creating "cold" master.

• Teachers feel that they do not know to the students enough to work with them in this so freely environment.

• Also with teachers there are real concerns about the organizational culture of the faculty for example; teachers say they should put scores on certain dates and to +consider the faults, even if the student work and send you all another day.

The objectives of the subjects are not according to the University's academic model and academy are created only as a requirement and generally not followed in the classroom.

4.- **What are the implications of student and professor experiences for the design of technology enhanced learning environments for Physical Education Teacher Education?**

52% of teachers and 35% of students felt that online education can be equal to or better than traditional classroom. However they said they had never used online classes.

- Literature says that when students have the opportunity to choose between online education and classroom; will choose online. However, 63% of students in this study did NOT choose online education.

- Students and teachers indicate that half may be too long and objectives could be achieved in less time; but the semester is

- Extended only to cover the official dates.

- In general, students consider the online system is feasible to be used in a virtual race EF.

- Some ideas about using online education in a degree in Physical Education such as the practical part of the race would be eliminated, or that you need to be face to face with the teacher; they turned out to be only paradigms NOT supported by students.

- Students and teachers believe that the faculty is working on an educational model that on paper should support self-regulation of students, but in practice it does: students and teachers say they have not heard of self-regulation.

- 50% of students expressed consider using an EF program online, since they consider that work online resembling reality of the classroom and say it is less stressful than in the classroom.

Appendix 23a: FINDINGS SENT TO THE EXPERT GROUP FOR A FINAL REVIEW (Spanish version).

¿Cuál es la influencia de utilizar educación online en alumnos de educación física en cuanto a necesidades de ayuda y autodeterminación?

- Maestros y alumnos piensan que hacer trampa o trabajar sin ética, sería más probable que ocurriera en un ambiente tan autónomo como la educación online.

  ¿Cómo llamaría usted a esto?

  ¿Lo ha vivido en la FCCF, cómo?

  ¿Lo ha vivido fuera de la FCCF, como?

- Los alumnos no piden ayuda aun cuando están batallando y no saben cómo manejar su tiempo.

  ¿Cómo llamaría usted a esto?

  ¿Lo ha vivido en la FCCF, cómo?

  ¿Lo ha vivido fuera de la FCCF, como?

- Los alumnos mintieron sobre que estaban trabajando y que habían mandado los trabajos (el Sistema online nos permitió ver que no era cierto).

  ¿Cómo llamaría usted a esto?

  ¿Lo ha vivido en la FCCF, cómo?

  ¿Lo ha vivido fuera de la FCCF, como?

- Los alumnos indican que el maestro sigue siendo una figura que los hace sentir presionados. ¿Qué opina usted de esto?

  ¿Cómo llamaría usted a esto?

  ¿Lo ha vivido en la FCCF, cómo?

  ¿Lo ha vivido fuera de la FCCF, como?

¿Cuál es la influencia de la educación online en la autorregulación de los estudiantes?

- 30% de los maestros no respondieron la pregunta: ¿cómo apoya la autonomía y autorregulación de sus alumnos en clase? y en general dijeron: "Creo que no la estoy promoviendo" y "en mi clase no es posible".

  ¿Qué opina usted de esto?

  ¿Cómo llamaría usted a esto?

  ¿Lo ha vivido en la FCCF, cómo?

  ¿Lo ha vivido fuera de la FCCF, como?

- Los alumnos dicen que la facultad no los motiva actualmente para autorregularse; todo se les da de antemano: como hacer las tareas, cuando entregarlas, etc.

  ¿Cómo llamaría usted a esto?

  ¿Lo ha vivido en la FCCF, cómo?

  ¿Lo ha vivido fuera de la FCCF, como?

- 8 de los 10 alumnos que usaron el sistema online, dijeron que no tuvieron tiempo para trabajar en el sistema y no pudieron completar la materia online.

  ¿Cómo llamaría usted a esto?

  ¿Lo ha vivido en la FCCF, cómo?

  ¿Lo ha vivido fuera de la FCCF, como?

- Existen preocupaciones reales sobre la cultura organizacional de la facultad por ejemplo; los alumnos están preocupados por las asistencias/faltas, aun cuando hagan los trabajos y los manden.

  ¿Cómo llamaría usted a esto?

  ¿Lo ha vivido en la FCCF, cómo?

  ¿Lo ha vivido fuera de la FCCF, como?

¿Cuál fue la experiencia de los maestros al ensenar en un ambiente virtual en la carrera de educación física?

- Para algunos profesores la educación online va contra la idea humanista de la Educación Física, por la posibilidad de crear maestro "fríos".

  ¿Cómo llamaría usted a esto?

  ¿Lo ha vivido en la FCCF, cómo?

  ¿Lo ha vivido fuera de la FCCF, como?

- Los maestros sienten que no conocen a los alumnos lo suficiente como para poder trabajar en esta forma tan libre con ellos.

  ¿Cómo llamaría usted a esto?

  ¿Lo ha vivido en la FCCF, cómo?

  ¿Lo ha vivido fuera de la FCCF, como?

- También con los docentes existen preocupaciones reales sobre la cultura organizacional de la facultad por ejemplo; los maestros dicen que deben poner calificaciones en ciertas fechas y tomar en consideración las faltas, aun si el alumno trabajo y mando todo en otro día.

  ¿Cómo llamaría usted a esto?

  ¿Lo ha vivido en la FCCF, cómo?

  ¿Lo ha vivido fuera de la FCCF, como?

- Los objetivos de los programas de las materias no están acorde al modelo académico de la universidad y se crean en academia solo como requisito y generalmente no se siguen tal cual en el salón de clase.

  ¿Cómo llamaría usted a esto?

  ¿Lo ha vivido en la FCCF, cómo?

  ¿Lo ha vivido fuera de la FCCF, como?

¿Cuál es el impacto de las experiencias previas de alumnos y maestros en el diseño de ambientes de educación virtual para educación física?

• 52% de los maestros y 35% de los estudiantes opinaron que la educación online puede ser igual o mejor que la tradicional del salón de clase. Sin embargo dijeron no haber usado clases online nunca. Porque considera usted que opinan sobre algo de lo cual afirman no tener experiencia?

- La literatura dice que los alumnos cuando tienen la oportunidad elegir entre educación online o en salón de clase elegirán online. 63% de los alumnos en este estudio NO eligieron la educación online.

  ¿Cómo llamaría usted a esto?

  ¿Qué opina usted de esto?

  ¿Por qué podrá estar ocurriendo?

- Alumnos y maestros indican que el semestre puede ser demasiado largo y los objetivos podrían lograrse en menor tiempo; pero el semestre se alarga solo para cubrir las fechas oficiales.

  ¿Qué opina usted de esto?

  ¿Por qué podrá estar ocurriendo?

- En general los alumnos consideran que el sistema online es factible de utilizarse en una Carrera de EF virtual.

  ¿Qué opina usted de esto?

- Algunas de las ideas sobre usar educación online en una licenciatura de educación física como por ejemplo, que se eliminaría la parte práctica de la carrera, o que se necesita estar cara a cara con el profesor; resultaron ser solo paradigmas NO respaldados por los alumnos.

  ¿Qué opina usted de esto?

  ¿Por qué podrá estar ocurriendo?

- Alumnos y profesores consideran que la facultad está trabajando un modelo educativo que en el papel debería apoyar la autorregulación de los alumnos, pero en la práctica no lo hace: los alumnos y maestros dicen no haber escuchado hablar de autorregulación.

  ¿Qué opina usted de esto?

  ¿Por qué podrá estar ocurriendo?

  ¿Lo ha vivido en la FCCF, cómo?

  ¿Lo ha vivido fuera de la FCCF, cómo?

- 50% de los estudiantes expresaron considerar usar un programa de EF online, ya que consideran que trabajar online se asemeja a la realidad del salón de clases y dicen que es menos estresante que en el salón.

  ¿Qué opina usted de esto?