Instructional design according to the mARC model

COLLABORATION

Instructional design according to the mARC model:

Guidelines on how to stimulate more experiential learning in higher education

Slaviša Radović

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The research reported in this thesis was carried out at the Open Universiteit in the Netherlands at the Faculty of Educational Sciences, formerly known as Welten Institute – Research Centre for Learning, Teaching and Technology, and under the auspices of ICO, the research school Interuniversity Centre for Educational Research.

Printed by ProefschriftMaken
Cover design by Stefanie van den Herik
Plant photo by Freepik

ISBN/EAN: 978-94-93211-39-1

Instructional design according to the mARC model: Guidelines on how to stimulate more experiential learning in higher education

PROEFSCHRIFT

ter verkrijging van de graad van doctor
aan de Open Universiteit
op gezag van de rector magnificus
prof. dr. Th. J. Bastiaens
ten overstaan van een door het
College voor promoties ingestelde commissie
in het openbaar te verdedigen

op vrijdag 25 maart 2022 te Heerlen
om 13:30 uur precies

door

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geboren op 17 november 1987 te Kruševac, Serbia

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Give me a lever long enough
and a fulcrum on which to place it,
and I shall move the world.

Archimedes

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Chapter 1

General Introduction

1.1 Introduction

Today's world is dynamic and ever-changing. The growing complexity of the workplace, social environment, and learners' aspirations for acquiring more knowledge have increased the need for continuous learning (Buschor & Kamm, 2015; OECD, 2019; Webster-Wright, 2009). At the same time, the necessity of lifelong and work-based learning has become a driving force for many educational reforms and curriculum development plans within organizations (OECD, 2019; EC, 2011). This aim of the studies presented in this thesis is to provide insight into better integrating learning about and in the workplace in the context of higher education. Such work-based learning can be expected to foster learning processes that are designed to develop intellectual, personal, critical and analytical skills. Such transversal (domain-independent) practical skills have been found to improve job performance and professional knowledge (Krieger & Ford, 2021; Nottingham, 2016).

Tynjälä et al. (2003) noticed that in traditional education, theory and practice have been separated and learnt in isolation. A series of articles studied this dichotomous approach in, for instance, academic and reflective theory (Smith, 1992), public and personal theory (Eraut, 1995), knowledge-for-practice and knowledge-in-practice (Cochran-Smith & Lytle, 1999), academic and practical knowledge (Even, 1999), and practical judgement' and epistemic theory (Korthagen & Kessels, 1999). To this issue, Hegender (2010, p. 151) adds that knowledge can be described as propositional ('knowledge that exist regardless of direct contact with a specific situation') and procedural ('knowledge that can only be expressed through procedures in a certain context with a clear intention to handle a specific situation').

The growing demand for workplace based learning has influenced formal higher education to start developing learning environments that support students in linking their practical experience to academic knowledge growth, and vice versa (Heinrich & Green, 2020). In their recent 'Science of Workplace Instruction framework' article, Kraiger and Ford (2021) explicated a number of instructional strategies and principles, recent trends and innovations that could positively impact such learning. They proposed and discussed strategies as: 1) organizing learning content in a way that are meaningful and helpful to learners; 2) optimizing the sequence of the content (balance between scaffolding, adaptive difficulty, and variety); 3) engaging learners in elaborating their own learning and knowledge recalling processes; 4) providing enough variability of practice and opportunity for applying skills and knowledge in

context; and 5) further developing knowledge and skills past initial mastery (using feedback, feedforward, and continuing practice on a task) (Kraiger & Ford, 2021).

It has become evident over the past decades, that the theory-practice debate in higher education has led to a shift from the 'theory-practice divide' towards a more dynamic and dialectical relation between the two. However, research efforts to improve higher education have articulated the need for better understanding how theory and practice should be conceptualized and connected during the formal education process (Cochran-Smith & Lytle, 1999; Oonk, 2009; Stenberg, Rajala, & Hilppo, 2016; Westbury et al., 2005). Bromme and Tillema (1995) acknowledged that for both becoming more professional and academic, students need to be engaged in the process of fusing theory and experience. Accordingly, Tynjälä et al. (2003, p.154) reasoned that "true integration of theoretical and practical knowledge is best fostered when university students transform abstract theories and formal knowledge for use in practical situations and, correspondingly, when they employ their practical knowledge to construct principles and conceptual models". In this way, a learner gets the opportunity to apply knowledge to new experiences (contextualizing knowledge). At the same time, new knowledge can arise from gaining concrete learning experiences and be converted into abstract generalizations (de–contextualizing knowledge) (Hennissen et al., 2017), but also from applying this new abstract knowledge in other learning experiences (re–contextualizing knowledge) (Lindsey & Berger, 2009). Thus, both processes of re- and de-contextualization (Kreber, 2001; Svinicki & Dixon, 1987) are suggested as key factors for the integration of different components of understanding during the learning process. It is precisely the relation between these essential contextualization processes that have been worked out in Kolb's cycle of experiential learning. Next subsections of this introductory chapter will therefore describe that model (1.1.) together with concerns about experiential learning (1.2) that will lead us to the main research questions (and studies) of this thesis (1.3).

1.2 Kolb's experiential learning model

Researchers often recognize the concept of experiential learning (Kolb & Kolb, 2017) as an effective approach to provide students with both practical experience and academic knowledge (Morris, 2020; Roberts, 2018; Tynjälä et al., 2003). "Experiential learning exists when a personally responsible participant cognitively, affectively, and behaviourally processes knowledge, skills, and/or attitudes in a learning situation by a high level of active involvement"

(Hoover & Whitehead, 1975, p. 25). Although Dewey (1938) noted that all learning is in essence learning from experience, Svinicki and Dixon (1987) make it clearer: learning becomes experiential only if an initial learning experience is processed to generate understanding. Learning is, therefore, "the process whereby knowledge is created through the transformation of experience" (Kolb, 1984, p. 41).

Kolb's experiential learning model considers learning as a cyclic process of four steps: concrete experience, reflective observation, abstract conceptualization and active experimentation. It demonstrates the ways a) knowledge is transforming from the spontaneous experience to mindful learning; and b) experience is transforming from reflective observation to active experimentation (Kolb, 1984). This process of learning is supposed to be a cyclic (spiral) and recursive, which enable students to learn and reflect on experience while working on a context-rich, real-world assignments.

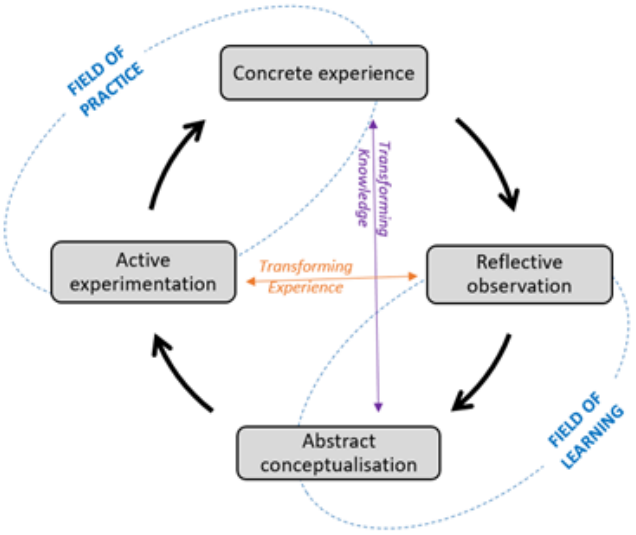


Figure 1.1. Kolb's experiential learning model

Building on the work of Dewey, Piaget, and Lewin, Kolb further explains that continuous process whereby understanding is "created through the transformation of experience" (Kolb, 1984, p. 38) following six propositions: 1) Learning is best conceived as a process, not in terms of outcomes; 2) All learning is re-learning; 3) Learning requires the resolution of conflicts between dialectically opposed modes of adaptation to the world; 4) Learning is a holistic process of adaptation; 5) Learning results from synergetic transactions between the person and the environment; 6) Learning is the process of creating knowledge.

1.3 Concerns over experiential learning

With the intends to increase experiential learning, Buschor and Kamm (2015) point out that educators face many challenges in supporting learners to combine both their knowledge and learning experiences. The complexity of experiential learning, together with critics of the Kolb's model, are emphasized in a number of studies (Boud et al., 1993; Castelijns et al., 2013; Morris, 2020; Roberts 2018). The most frequently mentioned issues are that experiential cycle does not take into account the contextualized nature of professional action (authenticity of learning tasks), the need for reflection in and on action (reflective learning), and the social aspects of collaborative learning (interaction between individuals) (Herrington & Oliver 2000; Holman et al., 1997; Ryan, 2011). It is generally acknowledged that, with learning in authentic contexts being essential for student engagement, critical reflection on such contextualized learning is also essential for learning and knowledge growth. From another perspective, Boyatzis and Kolb (1995) noted that while students can be engaged in the process of transformation of experience, they may not benefit equally from such an experience.

Others have noted that higher education institutions are often failing to comprehensively embrace experiential learning instruction (Roberts, 2018). There are several learning design factors that lead to superficial relation between experience and knowledge. First, educators have limited knowledge of design based processes of developing experiential learning instruction (Kreber, 2001; Young et al., 2008). As a result, students report to engage in the experience at a superficial level, unable to perceive the authentic, reflective, or social aspects of the learning environment (Ash & Clayton, 2004). Second, educators miss the potential to deepen educational design, instruction, assessment, and learning context in order to facilitate a more experiential learning (Heinrich & Green, 2020; Radović et al., 2021a). Decisions need to be made about learning content, then authentic tools, resources, and context, as well as timing of experiencing and reflecting, and sequence of these learning activities within the group (Radović et al., 2022). Finally, research studies argue that instructional gaps in the learning design reduce educative opportunities and learning benefits (Kreber, 2001). Loosely implemented learning design results in students' confusion, inability to follow the cyclic steps of experiential learning, and hinder knowledge de- and re-contextualisation (Heinrich & Green, 2020; Radović et al., 2020).

To cope with the complexity of educational design, instructional design (ID) models have been developed in a response to different pedagogical challenges and needs (Kraiger & Ford, 2021).

According to Gustafson and Branch (1997), ID models provide effective practical guidelines for instructional planning that educators can follow in a systematic and organized manner to develop high-quality instruction. While there are myriads of various ID models in the literature (e.g. Kemp's Model (Morrison et al., 2010), Dick and Carey's Model (Dick & Carey, 2000), Four-component ID Model (van Merrienboer et al., 2002)), there is obvious lack of models that can guide the efficient, effective, and systematic development of the learning process as conceptualized by Kolb (1984). Matsuo (2015) and Roberts (2018) noted that despite the growing body of research on various aspects of experiential learning, there is a need for a better understanding of instructional principles and elements that facilitate the construction of abstract concepts that can be implied on new situations (and vice versa).

1.4 Aim of this thesis

The main research question how to improve the relationship between practice and knowledge has been, and still is, a major challenge in higher education (Orland-Barak & Yinon, 2007). This thesis attempts to address shortcomings from previous research on experiential leaning, by conceptualizing and evaluating an instructional design model that facilitates more experiential learning environments. To address how different pillars of the suggested ID model match, and how they impact learning processes and outcomes, this thesis postulate three main research question:

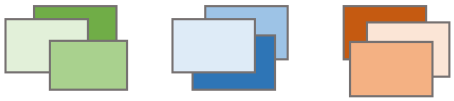
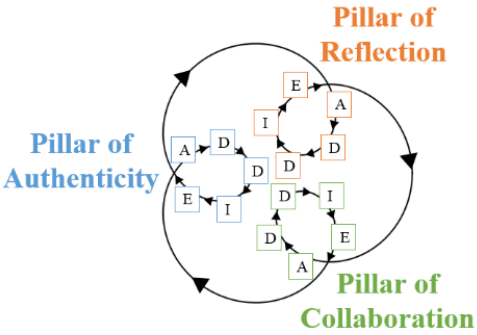
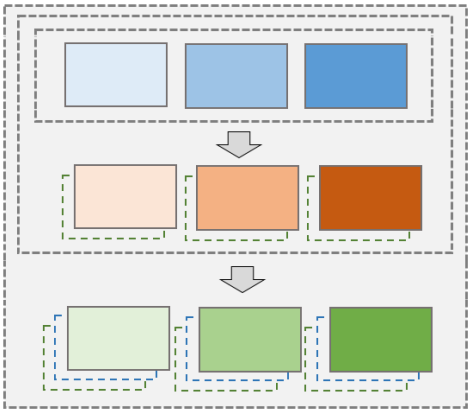
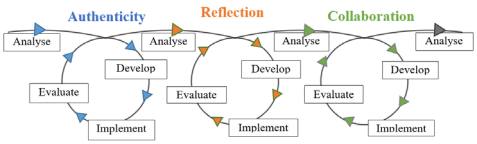
> RQ 1. Which instructional elements are relevant for experiential learning in higher education?
>
> RQ 2. How can experiential learning environment be systematically developed and redesigned?
>
> RQ 3. What are effects of redesigning courses so that more experiential learning takes place to students' academic performance, motivation for learning, and perception of experiential learning?

1.5 Research approach

The method of research presented in this thesis can be best characterized as quantitative experimental research (Anderson & Shattuck, 2012; Plomp, 2007). To achieve more

methodological consistency, the studies presented in this thesis were first situated in a real educational context of a Master course in higher education. Second, our research focuses on the designing and testing of significant interventions to support bridging experience and knowledge during formal learning process. Third, variety of research tools and techniques were used to collect and analyze both qualitative and quantitative data. Fourth, the research was carried out through three iterations using complementary designs with cumulative impact on practice during several years.

Table 1.1. Outline of the thesis in terms of Reeves's (2000) four phases in the conduct of design-based research (DBR).

Phases of DBR	Overview	Content of the thesis
1. Analysis of practical problems by researchers and practitioners		Chapter 2 Conducting Review study
2. Development of solutions with a theoretical framework		Chapter 3. Developing mARC ID model
3. Evaluation and testing of solutions in practice		Chapter 4. Authenticity in learning Chapter 5. Reflection in learning Chapter 6. Collaboration in learning
4. Documentation and reflection to produce design principles		Chapter 7. Overall summary of mARC ID model

The studies in this thesis followed the four phases of conducting design-based research (Table 1.1.) as described by Reeves (2000). Research started with a review study that analyzed practical problem by studying literature and exploring empirical results. Then we continued with the theoretical development of our solution. This phase aimed to develop an instructional design model with theoretical principles and effective instructional elements needed for a more experiential learning environment. After the development of our ID model, the third phase included the evaluation and testing of the model in our educational context. Evaluation and testing was accomplished through the iterative and cumulative implementation of the ID model through three empirical studies. The final phase in the process reviews overall results and suggests further research directions and practical implementations of the model.

1.6 Overview of the thesis

This dissertation consists of seven chapters. Chapter 2 describes a systematic literature study attempting to isolate and explore instructional elements that are relevant for experiential learning in higher education. It addresses the questions of how learning design can be conceptualized based on four components: *Learning environment* (the context in which learners work, specified at various level of design, characterized by the overarching learning activities); *Learning processes* (the way in which students engage with the learning environment and the learning activities embedded in it); *Learning outcomes*; and *Learning Factors*. Results are systematically compared using four perspectives to distinguish various instructional characteristics.

Chapter 3 provides more insight on the process of how experiential learning environments could be redesigned. It present and discuss the mARC (more Authentic, Reflective and Collaborative), a three-component instruction model with a set of instructional elements proven to strengthen the ties between theory (abstract knowledge) and practice (concrete experience). The point of departure for this chapter was defined by the results from the review study and supplementary theoretical concepts of authenticity, reflection, and collaboration.

The empirical studies are presented in chapters 4, 5 and 6. These studies examined whether the (three) hypothesized pillars of the mARC mutually influence and build on each-other, and how they impact students' learning outcomes. Chapter 4 provides empirical evidence on how different implementations of the authenticity pillar of mARC in the course design can be used to support students' motivation, academic performance and facilitate both re- and de-

contextualization of knowledge. In the experiment, we compared two learning environments in which authenticity was implemented differently (a less and more authentic learning environment). The research reported in this chapter implied that more authenticity gave students more practical experience to help construct theoretical concepts and involved them in testing ideas and experimenting with the course concepts. In the Chapter 5, the most effective authentic environment (i.e., More Authenticity) was used to further build and investigate the influence of three different levels of Reflection (No reflection, Less Reflection and More Reflection), and to understand how this supports experiential learning, motivation and academic performance. Students in the Less Reflection design were prompted toward providing evidence on understanding concepts and theory, or describing issues arising from concrete experience (Habitual actions and Understanding). Students in the More Reflection course were prompted to use practical context to think about theory (and vice versa) and to consider personal beliefs to have direct influence on learning activity (Reflection and Critical reflection). Chapter 6 provides empirical evidence on how collaborative reflection in the course design can be used to support students' motivation, academic performance and facilitate both re- and de-contextualization of knowledge. In this third and final empirical study within the cumulative DBR approach, the findings of the first two experimental studies had set the basic design. The most effective Authenticity and Reflection levels were used to study the influence of adding collaborative reflection elements of mARC ID.

Chapter 7 gives a summary of main results and conclusions from all three empirical studies and evaluates the overall suitability of mARC model. Furthermore, some practical guidelines on how practitioners may systematically redesign and conceptualize more experiential learning environments within their higher (online) education are shared. To conclude the chapter, directions for future research are formulated.

Chapter 2

The challenge of "more" experiential learning

Although a long time has passed since the theoretical foundation of experiential learning was proposed, designing experiential learning has proven to remain a challenge in higher education. This chapter contributes to this matter by reviewing 31 empirical articles that have provided insights into what this "more" experiential learning could be. Results are systematically compared using four perspectives to distinguish situated and general characteristics. The review highlights three pillars of learning environments that foster experiential learning (Authenticity, Reflection, and Collaboration) and learning processes within each pillar. Moreover, the chapter provides recommendations for future theory building and practical implementation.

This chapter is based on: Radović, S., Hummel, H. G. K., & Vermeulen, M. (2021). The Challenge of "More" Experiential Learning in Master of Education: Systematic Literature Review. *International Journal of Lifelong Education,* 40(5-6), 545-560

2.1 Introduction

Many argue that the gap between practice experience and academic knowledge is important when designing learning instructions for teachers, educational designers and other professionals in the educational sector (Cochran–Smith & Lytle, 1992; Hennissen et al., 2017; Korthagen, 2010). Long time ago, Dewey (1938) recognized the close connection between learning and experience. Yet, the question of how to efficiently bridge this gap is still occupying the attention of educational psychologists and researchers (Kolb, 1984; Reigeluth & Carr–Chellman, 2009; Roberts, 2018).

The experiential learning theory, as developed by Kolb (1984), provides a useful model for understanding ways in which knowledge and experience are related. Although Dewey (1938) noted that all learning is in essence learning from experience, Svinicki and Dixon (1987) make it clearer: learning becomes experiential only if an initial learning experience is processed to generate understanding. Dewey strongly emphasizes the need for thinking in a reflective way (Dewey, 1938). Building on the work of Dewey, Piaget, and Lewin, Kolb explains that learning is the continuous process whereby understanding is "created through the transformation of experience" (Kolb, 1984, p. 38). Kolb's experiential learning model considers learning as a cyclic process of four steps: concrete experience, reflective observation, abstract conceptualization and active experimentation. Furthermore, Kolb asserts that learning can begin during any stage in the cycle, although four steps are linked in a specific order. In this way, a learner gets the opportunity to apply knowledge to new experiences (contextualizing knowledge). At the same time, new knowledge can arise from gaining concrete learning experiences and be converted into abstract generalizations (de–contextualising knowledge) (Hennissen et al., 2017), but also from applying this new generic knowledge in other learning experiences (re–contextualising knowledge) (Lindsey & Berger, 2009). Learning is complete if both processes of re– and de– contextualization are addressed (Kreber, 2001; Svinicki & Dixon, 1987).

The complexity of designing effective experiential learning instructions, together with critics on the Kolb's model, are emphasised in a number of studies (Boud et al.,1993; Roberts, 2018). The most frequently mentioned issues are that the experiential cycle does not take into account social aspects of learning, group learning (Boud et al., 1993), and the need for interaction between individuals to understand experience. Billett (2014) concluded that both experiences and instructional strategies would be insufficient if learners would be left alone to reflect upon

learning experiences. From another perspective, studies criticize the absence of methods to support learners’ reflection (Boud et al., 1985). Additionally, the cyclic interpretation of the model may also give the impression that the learning steps are equal in terms of time, educational support and learners’ effort. The above leads to many challenges regarding the design of experiential learning in education.

2.1.1 Challenges in designing an experiential learning instruction

A variety of instructional methods and models are explicated to be used to support students progressing through the experiential cycle. Literature points to the real–world context of learning, including internships, practicums, fieldwork (Akinde et al., 2017; Lindsey & Berger, 2009), observational activities, and service learning (Svinicki & Dixon, 1987). In addition, more active learning through, for instance, role–playing, serious games or simulations, research projects (Lindsey & Berger, 2009), case studies and scenarios (Arnold & Paulus, 2010), and various types of problem–based tasks, will facilitate opportunities for experiential learning (Svinicki & Dixon, 1987). This also may include cognitive apprenticeships, guided participation (Boyd et al., 2013), and legitimate peripheral participation (Akinde et al., 2017; Wenger, 1999). However, these methods are often distilled across various levels of education ranging from primary school to higher education, and across different fields of learning, from small business learning to postgraduate learning (Lindsey & Berger, 2009). This variety helps scholars to recognize the need for experiential learning, however at the same time confuses how various learning instructions will work with specific domains of learning.

In addition, it is often complex to design experiential learning instruction that provide students with a multifaceted experience (Reigeluth & Carr–Chellman, 2009). Various educational programs involve different levels of experiential learning (Lindsey & Berger, 2009), and appear to be grounded on the principles of authentic (Herrington & Oliver, 2000; Kreber, 2001), reflective (Boud et al., 1985) or collaborative (Vangrieken et al., 2015; Wenger, 1999) learning instruction. However, there is little empirical research about how different learning instructions mutually influence and match each other, and how they impact learning outcomes (Roberts, 2018).

Finally, any instructional gap in the learning design reduces learning benefits (Kreber, 2001). Blair (2006, p. 134) emphasized that “simply inserting experiential learning instruction into education without providing a consistent experiential pedagogical framework reduces

achievement for learners". Although a plethora of learning strategies is suggested, up to date studies fall short in providing a comprehensive overview of all factors that facilitate experiential learning in one domain of learning (e.g., Billett, 2014; Roberts, 2018). Moreover, in a recent editor's note for the Journal of Experiential Education, Roberts (2018, p. 5) stated that more research is needed to "reveal both the current limitations and the possibilities" of experiential learning instructions within higher education.

2.1.2 Research questions for the review study

After an extensive literature search (to be described in the next section), it became clear that no systematic literature review on the instructional design of experiential learning in higher education had been published. This awareness, together with the previously expressed concerns and challenges (Blair, 2006; Roberts, 2018; Teräs, 2016), reveals the need for a comprehensive and rigorous literature review. Rather than attempting to distil unifying theory of experiential learning, our aim with such a review study was to extend the current insights by synthesizing research results and knowledge about proven experiential instructions.

To facilitate deeper understanding, this review focuses on the masters of education domain in order to carefully isolate and explore all instructional characteristics that are relevant. Although we do not claim that this domain of interest is different from others within higher education, this approach allows us to discuss and compare relevant (and various) results, having in mind the specific educational context from which they emerge (Billett, 2014; Hennissen et al., 2017).

The *first research question* for this review was: How is experiential learning organized? This question refers to the way in which the learning process is structured and which overall characteristics can be distinguished.

The *second research question* is focused on describing situated and general characteristics of the various learning processes. This can be phrased as: How are learning processes designed that enable and foster experiential learning?

The third aim of this review study is to provide a better understanding of what is needed for experiential learning processes to be successful. The *third research question* to be answered is: Which variables have an (facilitating and hindering) impact on the experiential learning?

The fourth aim of this study was to reveal learning outcomes. The *fourth research question* here is: What are the benefits and consequences of various experiential learning environments?

In summary, with these four viewpoints we intend to provide an evidence–based and structured discussion about what constitutes the “more” in “more experiential learning”, and how this can be achieved when designing learning (Reigeluth & Carr–Chellman, 2009).

2.2 Method

The research aims could be met by carrying out a systematic literature review using narrative evaluation methods to group and synthesize the selected studies. The methodological approach and review techniques proposed by Jesson et al. (2011) and Petticrew and Roberts (2006) were used to improve the quality of review.

2.2.1 Literature search strategy

In order to take into account all different points of view and to study all relevant literature, we searched for articles by using several database search engines. The search for literature was organised through two phases. During the first phase, the articles were located throughout a comprehensive search of various online databases (full database list is provided in Table 2.1). The choice of the online databases and the search terms was based on the theoretical concept of experiential learning, on previous trial searches of literature and the aim of our study (Petticrew & Roberts, 2006). Improvements led to the concluding set of keywords and databases for the final search reported here. We used a Boolean search query with combinations of the following keywords: Experiential AND teacher AND (master OR academic OR postgraduate OR graduate) AND (education OR learning OR knowledge). Moreover, we used stop words to further narrow down the search to the domain of interest.

Within the second phase of literature search we used bibliographic branching to find additional studies that met our criteria. We examined the reference list of each study that was considered relevant during the first phase. This was a cyclic process which was repeated until no more new studies were found.

Table 2.1. An overview of the search and evaluation protocol based on the PRISMA with the number of articles that were retrieved and passed the criteria within every step of evaluation.

Database	Identified after search	Included after inclusion criteria	Included after exclusion criteria
EBSCO	748	24	9
Web of Science	148	2	1
JSTORE	1058	7	1
SAGE Publishing	2104	6	1
Science Direct	1025	10	4
Springer link	787	6	2
Taylor and Francis	3077	29	8
Wiley Online Library	1504	0	0
Total database search	10451	84	26
Bibliographic branching (26 references lists)	906	5	5
Total number of articles reviewed			31

2.2.2 Inclusion and exclusion criteria

All identified articles were further evaluated based on the inclusion and exclusion criteria that were specified in advance (Jesson et al., 2011). The search and evaluation protocol report, presented in Table 2.1, is based on the guideline of the PRISMA (Preferred reporting items for systematic reviews and meta–analysis) statement (Moher et al., 2015).

Inclusion criteria

In the first evaluation step each article was scanned and appraised based on the abstract, title, and keywords (10451 studies were scanned within this step). To be included in the review, the article had to describe an empirical study on experiential learning in a master of education program within a broad range of degrees and programs. We included all studies from the time Kolb's experiential learning model was developed, so defined the timespan for the search to be from 1984 to 2019, and used following inclusion criteria (which had to be completely fulfilled) to identify relevant articles:

a) exploring learning process in a master of education program within a broad range of degrees and programs;
b) focus on experiential learning (in a very broad sense);
c) include empirical research methods;

d) published in English language and in a peer reviewed journal; and
e) published from 1984 until 2019.

If there was any doubt about whether to include an article or not, it was included and left for rigorous inspection and detailed exclusion criteria in the next step. After applying inclusion criteria, 84 articles were selected for such a further evaluation (see Table 2.1).

Exclusion criteria

Several exclusion criteria were applied during more thorough reading and quality assessment. During this stage of assessment, the integrity of the entire article was inspected. A decisive criterion was whether the study describes a process in which knowledge is created through transfer of knowledge or experience (15 studies did not meet this criterion). Furthermore, included studies had to contain (qualitative or quantitative) empirical data, thus both theoretical studies and national policy reports were excluded (29 studies did not meet this criterion). Next, the experiential learning had to be related to a formal higher education program, e.g. no short professional development or learning program not related to the formal education settings (14 studies did not meet this criterion). The authors discussed the eligibility of all articles until a full consensus was reached. In this way, initially 26 articles were selected.

During the process of bibliographic branching (the process of exploring the reference lists of each study) five more studies were located (906 bibliography items were inspected from 26 selected articles). Each bibliography list of these five studies was inspected correspondingly, but no more studies were found that could be included in the set of literature. Finally, a total of 31 studies was reviewed.

Additionally, we consulted Google Scholar using five distinct search queries (experiential teacher education; authentic teacher education; reflective teacher education; collaborative teacher education; experiential knowledge teacher education). We scanned the first 200 most frequently cited articles for each of the five Google Scholar search lists (1000 articles were scanned). The search output showed that all articles that met the criteria had already been included during one of the previous phases of the search protocol.

2.2.3 Data framework

Before writing a synthesis, we carefully read all the studies and made summaries within the context of the research questions and the theoretical framework of this review. Notes were further organized into common themes, categories and subcategories (Petticrew & Roberts, 2006). The LEPO framework (Phillips et al., 2010) for researching the effectiveness of learning environments has been further adapted for this review (see Table 2.2). We chose the LEPO as it uses various models of learning design to conceptualize three components of learning: *Learning environment* (the environment which facilitates learning), *Learning processes* (the activities which are part of learning), *and Learning outcomes* (the knowledge, behaviours, skills or understanding which can be demonstrated). We supplemented the three parts of the framework, with the component of *Learning Factors* as a fourth component, to bring the framework in line with our research aims.

Table 2.2. Four components of the Phillips et al. (2010) data framework further adapted and supplemented for this review.

Components	**Description**	**(Sub) Categories**
Learning environment	The context in which learners work, specified at various level of design, characterised by the overarching learning activities	Authenticity Reflection Collaboration
Learning processes	The ways in which students engage with the learning environment and the learning activities embedded in it.	Within each pillar, studies are further clustered according to the complexity of the learning process or the strength of social relations, and then analysed.
Learning factors	Refers to a range of variables proven to have a facilitating or hindering impact on the learning processes and learning outcome	Student Characteristics Initial level of knowledge and experience Personality factors Demographic factors Teaching and Learning Environment Characteristics Authentic task as factor Reflection as a factor Collaboration as factors Various expertise as factor Time as a factor Mediating Characteristics Approaches to learning Perception of the environment
Learning outcomes	Encompass different aspects of knowing, conceptual	Personal Characteristics Motivation and encouragement

Components	Description	(Sub) Categories
	understanding, discipline–specific and generic skills, and the range of values as a result of learning	Self–development skill Beliefs, values, attitudes and feelings Creativity Professional Characteristics Better understanding of profession Become more thoughtful and critical Knowledge Characteristics Learning achievement as benefit Learning process Characteristics Perceived significance and enjoyment as benefits Collaboration and community as benefits

For each research question and corresponding component of the framework, categories are organized in such a way that the results of the review can be easily classified according to the common attributes. In considering the *Learning environment*, based on 1) principles of Reigeluth and Carr–Chellman's (2002) theory of instructional design, and 2) Lindsey and Berger (2009) view on experiential learning, we have distinguished three categories: *Authenticity* (experience is activated in the context which is real and relevant to the learner); *Reflection* (experience is analysed in order to develop understanding and encourage a deeper knowledge); and *Collaboration* (learning occurs within communities of learners who share the process of meaning making from experience). In considering the *Learning processes*, we detailed each of the identified approaches of experiential learning. According to Reigeluth and Carr–Chellman's (2009) description, we define *Learning processes* as anything that is done purposely to facilitate learning.

The categorization of the *Learning factors* is done on the basis of the Charlier et al. (2015) framework, upon three sets of characteristics: *Student factors* (describing and understanding the role of variables, such as Cognitive skills, Academic past or Personality characteristics); *Learning Environment factors* (seen as a broad set of factors emerging from a learning processes, technical and instructional design and content of learning); and *Mediating factors* (characterizing interactions between students and learning environments, both in terms of representations and behaviours).

The categorization of the *Learning benefits* used by Stes et al. (2010) on the basis of the Kirkpatrick model (1994) of educational outcomes seemed the most appropriate for further

analysis. We decided to include both *Change within the teachers* and *Change within the students* as categories (with both categories related to students, but having a different focus: learning and practicing respectively). To further assemble the categorization, we have structured the model in groups of factors relevant to this review as presented in Table 2.2.

Following the methods from Petticrew and Roberts (2006) and Jesson et al. (2011), a table with a summary of all studies was made to prepare the synthesis process. In that next step, data from tables were grouped, organized and interpreted in the following sections. The data not presented in the tables were interpreted in text to complete the argumentation and to give a clearer picture of the experiential learning.

2.2.4 Summary of analysed studies

The following subsections describe the main characteristics and factors analysed in terms of publication year, country of publication, and research methods.

Years of publication

Looking at the publication dates of the 31 articles reviewed in this study (see Table 2.3), it becomes clear that most of the articles have been published after 2005. The pattern indicates that research into experiential learning in Master of Education programs is a fairly new field of empirical research and has recently received a lot of attention. Increased scholarship in this period may be a result of numerous national and worldwide educational strategies that advocate improving programs, advance knowledge, and linking practice and theory (ACE, 2003; OECD, 2005).

Table 2.3. Grouping the 31 studies reviewed in this study according to publication date

5–year period	Number of studies
1984 – 1989*	0
1990 – 1994	1
1995 – 1999	4
2000 – 2004	1
2005 – 2009	5
2010 – 2014	13
2015 – 2017**	7
Total	31

Note: *Six year period; **Three year period, seven studies included for period 2015–2017.

Countries of publication

Studies have been conducted all over the world except for the African continent. Thirteen studies were from the USA (twelve) and Canada (one), eight were from Europe (three both in the United Kingdom and Finland, and one each in Ireland and Estonia), six were from Asia (two in Taiwan, and one both in Turkey, Pakistan, Hong Kong and Korea), and four were from Australia (two) and New Zealand (two). A larger number of studies originated in the USA. This has also been echoed in previous systematic literature reviews exploring the impact of instructional development in higher education. For example, in the literature review study from Stes et al. (2010), 30 out of the 36 studies involved in the synthesis were North American studies. Unlike such obvious convergence, the studies included in our review better represent almost all continents.

2.3 Results

Results in this section are presented and discussed on the basis of the research aims and questions. The studies reviewed were clustered based on the predominant characteristics of the learning environments as reported within their research method sections. Findings were grouped to gain more insights on: a) the learning environments of experiential learning and processes (subsection 3.1); b) factors that influence these learning processes (subsection 3.2); and c) the benefits and consequences of these learning processes implementations (subsection 3.3).

2.3.1 Clarifying the characteristics of experiential learning environments

Three dominant approaches to support experiential learning were observed within the literature: a) learning is a constructive process with a clear relationship with the nature of the real world outside the classroom (Authenticity); b) learners are supported to reflect on knowledge and experience and to think critically (Reflection); and c) learning (a part of it or the whole process) is situated and mediated in a social context (Collaboration).

These three characteristics can be considered as three pillars to be implemented in different settings, with variations and different learning processes to design experiential learning. A review of the literature shows that these main characteristics are equally distributed across studies. Both Authenticity (A) and Reflection (R) are treated in 19 studies, and Collaboration

(C) is treated in 17 studies (see Figure 2.1). Within the next subsections 3.1.1–3.1.3 these characteristics are described in more detail.

Figure 2.1. Diagram showing the number of studies and various combinations of the main learning approaches encountered for designing experiential learning.

Authenticity

Evidence from literature suggests that authenticity is a key to support the experiential learning circle. Several authors argue that authentic learning activities support learners to grow and develop their knowledge and skills (Hramiak et al., 2009; Herrington & Oliver, 2000). Within the literature two dominant approaches to achieve authenticity were observed: a) field trips; and b) problem–based learning. We subsequently analysed the characteristics of field trips as growing levels of student involvement with the authentic experience. These complexity levels ranged from (passive) observation via (active) participation to ultimately to engaging in research actions. We finally described problem–based tasks for authentic learning.

Observation during field trips. In several studies, the importance of student observation during field trips was considered as a method to increase understanding of the profession (Aiken & Day, 1999; Akinde et al., 2017). Although observations in the classroom prove to be an important and necessary part of teacher education, results sometimes show that not all aspects of the professional practice were experienced. Aiken and Day (1999) found the lack of experiencing professional activity to be a crucial missing element of experiential learning.

However, observations can provide a successful contextualisation for learning. Akinde et al. (2017) describe a practical field trip experience organized in three phases with different learning foci and observational contexts. In their study, the field trip is followed by classroom sessions. Supplementary learning tasks, such as reflective writing, were used to complete the

cycle of experiential learning and to enable reflection (Akinde et al., 2017). The similar principle of observation, within different facilities (related to the field of professional specialization) and different learning contexts (related to the curriculum), was applied in Ernst's study (2013). The evidence he presents supports the idea that additional classroom learning sessions serve as a framework for discussion and understanding of the meaning that emerged from the experience.

Participation during field trips. While in the previous studies authenticity was implemented through observation, the study by Sutherland and Markauskaite (2012) implemented authenticity as students’ active participation in a community of practice (Wenger, 1999). Within their study, a discussion forum of teachers, experts in the field and students was created as a mechanism to: a) provide opportunities for engagement with education theory and practice; b) support students initial engagement with future professional community members; and c) introduce students to the relevance of education theory concepts from authentic professional practice (Sutherland & Markauskaite, 2012).

In several studies it was argued that providing opportunities for students to engage and experiment not only stimulates learning, but also improves transfer between experience and knowledge (Cannon & Scharmann, 1996; East, 2014; Korkko et al., 2016). East (2014) states that it is crucial both to learn about pedagogic innovation (for acquiring the knowledge) and to implement an innovative teaching approach within school (for gaining the practical experience). Hramiak et al. (2009) describe a more extensive authentic field trip with a total duration of 24 weeks. While the focus of authentic experimentation in East’s (2014) study was based on pedagogical innovation, the aim of authenticity in the Hramiak et al. (2009) study was developing professional identity. Guided reflective writing (about the topic of practice) was a mechanism used to describe experience and make learning explicit (Korkko et al., 2016).

A variety of studies consider the importance of social context for learning during field trips (Harford & MacRuairc, 2008; Wenzlaff & Wieseman, 2004). Wenzlaff and Wieseman (2004) emphasised that cohort structure and collaboration help students to bridge knowledge from theory and practice experiences. Similarly, Harford and MacRuairc (2008) reported that collaborative reflection assists students to extend their understanding of relevant literature and to critically examine their own and others’ experiences.

Teacher inquiry and action research during field trips. Students can become even more actively involved in field trips by experiencing the process of inquiry in a research–oriented project, as a means of understanding the practical issues from a theoretical perspective (Hagevik, 2012; Hill & MacDonald, 2016; Hursen, 2016). Swaggerty and Broemmel (2017) organised this type of learning in two steps: first gaining knowledge about the research on teacher actions, and then conducting research and reflecting on results. During the first semester students read articles, learn about research methods, while during the second semester they conduct the research, write a report and share conclusions. Similarly in Hursen's (2016) study, students were given a research and inquiry oriented task. Students were asked to identify issues of curriculum implementation in a real school setting. Online journals written by students were public, so that they could see each other's points of view and write answers and comments.

Hill and MacDonald (2016) conceptualise experiential learning as a direct encounter between the learner and the world of practice through an inquiry process. As part of their learning program, students engage in action–oriented projects supplemented with theoretical knowledge inquiries. In addition to reflective writing activities, they create a cohort structure of students during inquiry as dialogue spaces within the community of practice (Wenger, 1999).

Problem–based tasks. Different studies emphasized that solving problem–based tasks can support students' involvement in the experiential learning circle (Arnold & Paulus, 2010; Celik, 2012; Hursen, 2016). Various strategies have been considered to stimulate critical and reflective thinking, and to encourage students to apply knowledge and skills to develop a solutions to a defined learning problems. In the study by Howard et al. (2014), students were given a detailed scenario, and were motivated to construct a solution by taking into account relevant documents from a variety of sources. Several studies (e.g., Arnold & Paulus, 2010; Ng, 2008; Rawlins & Kehrwald, 2014) considered technology as an agent to develop effective problem–solving skills and approaches. For example, in study by Rawlins and Kehrwald (2014) technology was an integral part of authentic learning where students learning about educational technologies as both pedagogical tools, and as means to solve real–world problems. Students are given the opportunities to make sense of the concepts, real–life problems, and subject matter. Often, they were encouraged to participate in collaborative processes of social negotiation and evaluation of one's perspective. In the study by Ng (2008), a series of learning principles were placed into practice to promote online collaborative problem solving (joint

work, online discussions, role play activities that reflect real life situations, and finally developing and presenting relevant projects).

Reflection

Reflection and related terms such as reflective practice, reflective thinking, reflexivity, and critical reflection have proved importance for supporting learning (Kember et al., 2008). Both the initial experience and the authentic learning activities are significant for enabling the re– and de– contextualization of knowledge, but those alone do not make experiential learning. Many authors suggest that reflection should follow learning as an essential step, so that knowledge can result from processed experience (Billett, 2014; Mena Marcos & Tillema, 2006). In studies it was argued that students often return to their experience during the process of reflection, making important considerations and linking them to both theoretical knowledge and beliefs.

However, engaging with reflection, relating practice and theory and moving beyond personal beliefs are often challenging for students. The literature included in this review points out that students should be supported and guided to enable meaningful (critical) reflection (Chi, 2013). A variety of studies emphasize the importance of guided reflective writing according to the specific aim of activities (Bain et al., 1999). Reflection–on–action was implemented in Yang’s (2009) study as a tool to analyse and interpret the students’ experience, both from group meetings and from practical teaching sessions. In studies by Korkko et al. (2016) and East (2014) the written reflection was structured by means of reflection–in–action and reflection–on–action processes during learning. Some authors argue for providing additional time for prolonged reflection (Leijen et al., 2014) or consistency in reflection writing (Chi, 2013) to be beneficial for the reflection process and for understanding development.

Several studies used reflective blogging as method to enhance professional development (Bain et al., 1999), professional identity (Korkko et al., 2016), to understand practical experience (Boyd et al., 2013), and to analyse feelings (Bain et al., 1999) and beliefs (Hill & MacDonald, 2016). While sometimes reflective writing stays private between student and teacher (Hramiak et al., 2009), very often shared reflection between peers (or school supervisors) is used to guide thinking and encourage reflective skills development (Stenberg et al., 2016). Throughout reflective writing, teachers and instructors are able to see students’ de– contextualisation of previous practical experiences, their thinking about new theories and the way in which they

were encountered in practice (Boyd et al., 2013, Chi, 2013). In addition to the written portfolio and the guided reflection, Toom et al. (2015) recorded video lessons as useful tool for delayed reflection and to focus on the behaviour and individual action. Harford and MacRuairc (2008) argue that the use of peer–videoing in the classroom promotes reflective practice among students. They point out that with the aid of prompts, students could become more meaningful peer reviewers, more critical and analytical.

To engage in reflection, an individual's active participation is needed. Moreover, very often sharing reflections and comments within a community is seen as a mechanism to broaden understanding. Several studies noted that interaction with knowledgeable peers (Harford & MacRuairc, 2008), communities of practice (Yang, 2009), teachers' support (Stenberg et al., 2016; Hramiak et al., 2009), or experienced professionals (Sutherland & Markauskaite, 2012) are prerequisites for improving reflective practice and for developing personal perspectives further. Moreover, involvement in a community or cohort enabled students to consider multiple points of view and to take a different perspective.

Collaboration

Collaborative work provides multiple advantages for students working and learning in complex learning environments (Herrington & Oliver, 2000; Sutherland & Markauskaite, 2012). In the process of re– and de– contextualization of experience and knowledge, peer support and collaboration seem especially important for the way in which the transitions between steps in the experiential learning cycle can be supported. This subsection aims to provide an overview of the focus and complexity of such activities, as different forms of collaboration with different depth could be noticed (Vangrieken et al., 2015). We used Little's (1990) continuum scale to discuss differences in the relational strength of interactions between members of a group.

Many studies emphasize that *storytelling and scanning for ideas* supports the experiential learning process. When engaging in storytelling and scanning for ideas, according to Little (1990), members exchange experiences, gather information, and nourish friendships. Sutherland and Markauskaite (2012) initiated online discussions as a mechanism to provide an initial engagement with practical experiences. In these interactions, the students were the recipients of ideas and resources for professional skill development from more experienced professionals. Arnold and Paulus (2010) implemented a social networking site (with features

such as blog, chat, wiki and discussion tool) for student–teachers to communicate, share ideas, and store documents and information.

Aid and assistance within a group are considered within several studies. According to Little (1990), this is an approach that may yield new ideas when memberss independently seek out advice from one another. Swaggerty and Broemmel (2017) have implemented collaboration during the action research process within groups in order to facilitate planning research proposals, conduct research and practise presentations. Yang (2009) implemented blogging as a tool for student–teachers to ask questions and to encourage peers to discuss ideas and express their concerns.

A variety of studies considered *sharing work* as a method to foster collaboration. Harford and MacRuairc (2008) engaged students in peer–videoing of class teaching in real time and the subsequent practice of sharing material and group analyses of their teaching. Hagevik et al. (2012) added a collaborative approach to individual projects. They placed students in groups for discussion and sharing work throughout the year (such as finding related literature, deciding research techniques, and distributing work over different parts of reports). To engage students in critical–thinking, Howard et al. (2014) planned roles within groups in accordance with the authentic problem and realism of the learning scenario. In the study by Rawlins and Kerhwald (2014), group learning offered students a possibility to divide work among the members, as different expertise was needed to complete the task.

According to Little (1990), during *joint work,* group members are interdependent in at least one part of their learning assignment. Cannon and Scharmann (1996) organised group work so that each group member had a specific task to perform in accordance with other members. Students prepared lessons as a group task and engaged in teaching at the local school as a group. Ng (2008) attempted to foster peer learning in the group by shared responsibility over joint work. Within her study, peer learning includes a joint group project, online discussion, and giving feedback on the work of a member of the group. To facilitate group activities (doing all their work together), Celik (2012) and Cowan (2012) applied complex authentic tasks. This was a way to involve a community of students with social construction of knowledge. Howard et al. (2014) and Cowan (2012) argue that collaborative problem solving activities should come after students have constructed concepts based on their prior knowledge, learning, or experience. Finally, to promote experiential learning with authentic tasks, Cowan (2012) implemented several learning principles based on community of practice strategies: 1)

Establish a community with cohorts (facilitate peer support, help building personal relationships, and share different expertise of members); 2) Provide a process for community development (e.g., four days initial retreat to become acquainted with one another, then use collaborative groups for joint work, initiate discussions, and build network of students for the rest of the course); 3) Take advantage of the diversity in professional experience (make use of different interests and knowledge of group members, allow for more diverse contributions to learning activities, and make different viewpoints and perspectives visible); and 4) Utilize multiple levels of expertise with alumni instructors (offer varying level of mastery within the community as a vital bridge between students and course teachers).

2.3.2 Facilitating and hindering factors that influence the experiential learning process

The literature emphasizes that effective experiential learning only emerges when a number of conditions are met. This subsection addresses the third research question of this review study by providing more detailed insight into factors that facilitate and impede experiential learning within the domain in focus. We have distinguished three groups of characteristics (Student, Teaching and Learning Environment, and Mediating factors) and their subcategories. A complete overview can be found in Table 2.4 (facilitating factors) and Table 2.5 (hindering factors).

Overview of facilitating factors of experiential learning process

A distinction between groups of beneficial factors was made. First of all, facilitating factors relating to students' characteristics include age (Bain et al., 1999), previous education (Buzdar & Ali, 2013), and work experience (Hagevik et al., 2012). This first category also includes collaboration between peers (Chi, 2013) and personal factors such as being able to act with integrity, openness, and commitment (Chi, 2013).

The second group (Teaching and Learning Environment Characteristics) of factors are related to the learning aims, method of instructions, the interaction between peers and teachers, and physical infrastructure (Charlier et al., 2015). This group also includes Authentic tasks as a factor (how characteristics of authenticity influence activation and formation of experience (Rawlins & Kehrwald, 2014)); Reflection as a factor (how reflection was operationalised in terms of structure, guidance, and depth, to foster understanding experience (Bain et al., 1999));

and Collaboration and community as factors (related to social aspect of cohort, peers working together and socially shared understanding of experience (Howard et al., 2014)). This also includes Variety of expertise; various partnerships with professionals and experts during learning (Korkko et al., 2016); as well as a variety of previous experiences between peers (Matthews & Jessel, 1998); and Time as a factor (prolonged reflection, reflection over longer time period and time spent during reflective writing (Leijen et al., 2014)).

The final category mentions Mediating Characteristics in terms of Approaches to learning (support and guidance enhances understanding of experience and scaffolding improves the quality discussion) and Perception of the environment (perception of relevance of learning task (Celik, 2012) and feeling connected with peers during learning (Arnold & Paulus, 2010)).

Table 2.4. Overview of facilitating factors.

Group	Subgroup	Factors
Student Characteristics	Initial level of knowledge and experience	– Having more experience influences the level of reflection and corresponding benefits, R (Leijen et al., 2014), RC (Hagevik et al., 2012). – Previous knowledge about topic affects reflection, R (Buzdar & Ali, 2013).
	Personality factors	– To engage in critical reflection, one must be able to act with integrity, openness, and commitment, rather than by compromising, being defensive or fearful, R (Chi, 2013). – Communication between peers using discussion forums improves collaboration, AC (Arnold & Paulus, 2010; Swaggerty & Broemmel, 2017).
	Demographic factors	– More mature students were able to engage in more sophisticated reasoning, RC (Bain et al., 1999).
Teaching and Learning Environment Characteristics	*Authentic task as factor*	– Variety of school, classroom settings, and teaching situations enriches learning, A (Aiken & Day, 1999). – Authentic tasks supported collaboration, AC (Rawlins & Kehrwald, 2014). – Authentic learning activities during practicum enhanced students' reflection, AR (Korkko et al., 2016). – Authenticity within course content was essential for learning, AC (Wenzlaff & Wieseman, 2004). – Providing students with a very clear set of expectations, AC (Cowan, 2012).
	Reflection as factor	– Guided reflection contributes to a more profound analysis of experience, R (Leijen et al., 2014; Toom et al., 2015), AR (Korkko et al., 2016). – Comments from instructors influence deeper and more critical thinking, AR (Hramiak et al., 2009), RC (Yang, 2009).

Group	Subgroup	Factors
		– Critical thinking improves linking theory and practice, RC (Bain et al., 1999). – Longer reflective entries enhances learning, RC (Bain et al., 1999).
	Collaboration and community as factors	– Collaboration with peers and shared workload positively influences learning, AC (Howard et al., 2014). – Commitment of faculty members to support cohort building, C (Seed, 2008). – Initial retreat activities support building groups, AC (Cowan, 2012). – The cohort was an integral aspect of creating a collaborative culture, AC (Wenzlaff & Wieseman, 2004). – The cohort model has a positive role during learning, AC (Wenzlaff & Wieseman, 2004). – Early collaborative field trips help develop knowledge, AC (Cannon & Scharmann, 1996).
	Various expertise as factor	– Involve multiple levels of expertise: alumni instructors, AC (Cowan, 2012). – Partnership between students, mentoring teachers, school supervisors and action research teachers, RC (Hagevik et al., 2012). – Variety of previous experience between peers increased learning in the group, AC (Cowan, 2012). – Involve professionals in online discussion supported learning, ARC (Sutherland & Markauskaite, 2012). – Feedback from various sources supports reflection, AR (Korkko et al., 2016). – Discussions with school based tutors was beneficial for development, R (Matthews & Jessel, 1998).
	Time as a factor	– As the study progressed, the depth of reflection and critical discussion improved, AR (Korkko et al., 2016), ARC (Harford & MacRuairc, 2008). – Prolonged reflection supported writing, R (Leijen et al., 2014). – Time spent on reflective writing improved reflection, RC (Bain et al., 1999). – Participate in long–term thematic practicums of teaching and learning, R (Stenberg et al., 2016).
Mediating Characteristics	Approaches to learning	– Guidance enhances reflection, R (Chi, 2013; Harris & Russ, 1994). – Scaffolding improves the quality of critical discussion, ARC (Harford & MacRuairc, 2008).
	Perception of the environment	– Perception of relevance of the authentic task, ARC (Celik, 2012). – Comfort and feeling connected with each other in the group supports learning, AC (Arnold & Paulus, 2010; Wenzlaff & Wieseman, 2004).

Note: Learning approaches: A = Authenticity, R = Reflection, and C = Collaboration.

Overview of hindering factors of experiential learning process

An overview of hindering factors grouped by characteristics can be found in Table 2.5. An important personal factor, that hinders experiential learning, is a student's lack of knowledge and classroom practice. Other main factors mentioned as hindering include the struggle to work in teams (Cowan, 2012), lack of personal contact between team members (Howard et al., 2014) and fear that feedback might influence group harmony (Leijen et al., 2014). The literature also emphasizes factors as not authentic learning activities and un–guided reflection process.

For some factors, literature did not show the influence on learning outcomes (Table 2.5). These include gender (Bain et al., 1999), level of previous experience, as well as technology anxiety (Rawlins & Kehrwald, 2014). Furthermore, results from several studies argue that sometimes the influence of factors depends on the context of the study and the type of learning outcomes. For example, instructor involvement (Cannon & Scharmann, 1996) and collaboration (Ng, 2008) has not improved student achievement.

Table 2.5. Overview of hindering and factors without influence.

Influence	Group	Factors
Hindering	Student Characteristics	– Student lack of content knowledge and classroom practice, A (Aiken & Day, 1999). – Lack of previous theoretical knowledge, RC (Bain et al., 1999). – Lack of openness, trust, and freely sharing ideas., RC (Yang, 2009). – Some students struggle with working in teams, AC (Cowan, 2012). – Lack of personal contact between peers, AC (Howard et al., 2014).
	Teaching and Learning Environment Characteristics	– Organization of learning activities (should be more careful designed with more authentic activities), A (Aiken & Day, 1999). – Self–reflection without guidance lead to the feeling that the process is difficult and less beneficial, R (Leijen et al., 2014).
Without influence	Student Characteristics	– Gender, RC (Bain et al., 1999). – Technology anxiety didn't influence learning, AC (Rawlins & Kehrwald, 2014). – Level of previous experience, AR (East, 2014).
	Teaching and Learning Environment Characteristics	– Instructor involvement, AC (Cannon & Scharmann, 1996). – Collaboration did not improve student achievement, AC (Ng, 2008).

Note: Learning approaches: A = Authenticity, R = Reflection, and C = Collaboration.

2.3.3 Benefits and negative consequences of the experiential learning process

While in the previous subsections factors for effective experimental learning were listed, this subsection will explore the benefits and negative consequences of different experiential learning approaches. For a deeper understanding of the effectiveness of learning environments in facilitating desired outcomes, an overview of beneficial factors, grouped as characteristics, can be found in Table 2.6. Negative consequences will be discussed afterwards.

Overview of benefits of experiential learning process

We encountered a variety of reasons to implement experiential learning, distinguishing four groups of benefits with respective subcategories. As it can be seen in Table 2.6, perceived benefits of experiential learning are equally distributed across groups. *Personal* benefits reported include four subcategories: Motivation and encouragement (Celik, 2012); Self–development skill; Beliefs, values, attitudes (Chi, 2013); and Creativity (Ernst, 2013). Students reported more motivation, to feel better as a learner, and to believe in the benefits of the course (Hursen, 2016). Most reported *professional* benefits of experiential learning are placed in two subgroups: Better understanding of profession and practice; and Becoming more thoughtful, reflective and critical. Students were reported to be able to focus on strengths and weakness of practice (Harris, & Russ, 1994), and to have a broader perspective on future work (Akinde et al. 2017). *Knowledge* Learning achievement benefits reported include developing deeper understanding (Sutherland & Markauskaite, 2012), broader knowledge (Seed, 2008), and having greater achievement and success (Ernst, 2013). Finally, benefits reported for the *learning process* were factors such as Perceived significance (Akinde et al. 2017), and Enjoyment (Celik, 2012); and Collaboration and community (Arnold & Paulus, 2010).

Table 2.6. Overview of benefits.

Group	Subgroup	Perceived benefit
Personal	Motivation and encouragement	– Develop motivation for teaching, A (Aiken & Day, 1999). – Develop motivation to learn, C (Seed, 2008). – Promote inner motivation, ARC (Celik, 2012). – Develop more autonomy, R (Chi, 2013) . – Feel better as learners, R (Chi, 2013). – Feel prepared for future work, AR (Akinde et al., 2017), R (Chi, 2013; Harris, & Russ, 1994)

Group	Subgroup	Perceived benefit
	Self–development skill	– Feeling of being self–directed, AC (Hursen, 2016; Wenzlaff & Wieseman, 2004). – Enhance self–development skills, C Seed (2008). – Enhance self–efficiency, AC (Cannon & Scharmann, 1996). – Increase self–confidence, R (Leijen et al., 2014; Matthews & Jessel, 1998). – Promote abilities of self–analysis and self–assessment, R (Chi, 2013), RC (Bain et al., 1999).
	Beliefs, values, attitudes and feeling	– Examine beliefs, values, attitudes and actions, R (Chi, 2013; Matthews & Jessel, 1998), AR (East, 2014), ARC (Hill & MacDonald, 2016). – Believe in the course benefits and highly appreciate the course, AC (Hursen, 2016). – Being able to better articulate or defend beliefs, ARC (Hill & MacDonald, 2016). – Being able to freely express thoughts and opinions, AC (Hursen, 2016). – Feel responsible for learning, AC (Hursen, 2016).
	Creativity	– Encourage creativity and experimentation, AC (Rawlins & Kehrwald, 2014). – Mediate and support pedagogical innovations, A (Ernst, 2013), AR (East, 2014), ARC (Harford & MacRuairc, 2008).
Professional	Better understanding of profession and practice	– Better understanding of profession and practice, A (Aiken and Day,1999), R (Buzdar and Ali, 2013), AR, (East, 2014), RC (Hagevik et al., 2012). – Improved perceptions of own teaching, AR (Korkko et al., 2016). – Evaluate own practice and focus on strengths and weakness, R (Harris, & Russ, 1994). – Have broader perspective of future work, AR (Akinde et al. 2017). – Enhance overview of school systems, A (Aiken & Day, 1999), AR (Akinde et al., 2017). – Learn about various teacher roles, AR (Akinde et al. 2017). – Improve classroom practice and supporting reflective teaching AC (Wenzlaff & Wieseman, 2004).
	Became more thoughtful, reflective and critical	– Re–think and re–appraise practical experience, R (Buzdar & Ali, 2013; Harris, & Russ, 1994), RC (Hagevik et al., 2012), ARC (Hill & MacDonald, 2016). – Become more thoughtful and critical, R (Buzdar & Ali, 2013; Chi, 2013; Matthews & Jessel, 1998; Toom et al., 2015), C (Seed, 2008), RC (Yang, 2009), AR (East, 2014), ARC (Harford & MacRuairc, 2008). – Improve ability to reflect on the theoretical knowledge, AR (Korkko et al., 2016), RC (Yang, 2009), ARC (Harford & MacRuairc, 2008).

Group	Subgroup	Perceived benefit
Knowledge	Learning achievement as benefit	– Knowledge test achievements were improved, A (Ernst, 2013), AC (Hursen, 2016). – Develop deeper understanding, ARC (Sutherland & Markauskaite, 2012). – Better understand theoretical content, R (Toom et al., 2015), RC (Bain et al., 1999). – Improve student teacher success rate, AC (Hursen, 2016). – Improve knowledge concerning real world application of content, A (Ernst, 2013), AC (Howard et al., 2014). – Obtain broader knowledge, C (Seed, 2008), ARC (Sutherland & Markauskaite, 2012).
Learning process	Perceived significance and enjoy as benefit	– Perceived as significant and necessary component of teacher preparation, A (Aiken and Day,1999), AR (Akinde et al. 2017), RC (Bain et al., 1999). – Provide valuable learning experience, ARC (Celik, 2012). – Learning was real and relevant, AR (Akinde et al. 2017), AC (Howard et al., 2014). – Positive and enjoyable learning environment, A (Ernst, 2013), AC (Wenzlaff & Wieseman, 2004), ARC (Celik, 2012). – Increased interest for the learning process, AC (Ng, 2008).
	Collaboration and community as benefit	– Being able to learn from more experienced peers, AC (Rawlins & Kehrwald, 2014; Wenzlaff & Wieseman, 2004). – Take advantage of professional experience diversity, AC (Cowan, 2012; Howard et al., 2014). – Encourage to collectively construct solutions, AC (Rawlins & Kehrwald, 2014). – Provide opportunity for joint work, AC (Howard et al., 2014; Ng, 2008), ARC (Hill & MacDonald, 2016) – Provide space for discussing ideas, AC (Ng, 2008; Swaggerty & Broemmel, 2017), RC (Bain et al., 1999). – Share points of view, AC (Arnold & Paulus, 2010; Cowan, 2012; Howard et al., 2014), RC (Bain et al., 1999). – Students become highly engaged with each other, AC (Arnold & Paulus, 2010; Cowan, 2012; Swaggerty & Broemmel, 2017), ARC (Harford & MacRuairc, 2008). – Peer support, AC (Arnold and Paulus, 2010). – Community building between members, R (Boyd et al., 2013), C (Seed, 2008), AC (Cowan, 2012; Wenzlaff & Wieseman, 2004), RC (Yang, 2009). – Tutors were able to access students reflection in any moment during the semester, AR (Hramiak et al., 2009), AC (Swaggerty & Broemmel, 2017).

Note: Learning approaches: A = Authenticity, R = Reflection, and C = Collaboration.

Overview of negative consequences of experiential learning process

Most negative consequences occur when students argue that programs did not provide them with "real" experiences (Aiken & Day, 1999). Another important hindrance is when student–teachers have difficulty with connecting practical experiences and theory (Leijen et al., 2014). Different studies have mentioned that students perceive this learning as being too time and energy consuming (Chi, 2013; Hramiak et al., 2009) or that they reach levels of reflection lower than was expected (Boyd et al., 2013). Although the number of consequences was significantly lower than the number of benefits presented earlier, special attention should be paid to them in order to guarantee effectiveness and desired outcomes.

2.4 Conclusion and discussion

This review study provides a better understanding of the characteristic of experiential learning environments that facilitate connecting (academic) knowledge and (professional) experience. Rather than attempting to find an unifying theory of experiential learning (as presented in Lindsey & Berger, 2009; Reigeluth & Carr–Chellman, 2009; Svinicki & Dixon, 1987), our aim was to review and discuss learning environments to better understand the characteristics that effectively facilitate experiential learning processes and learning outcomes (Figure 2.2). A systematic literature review (Petticrew & Roberts, 2006) was conducted that yielded 31 empirical studies that met our criteria for inclusion. Here, we will briefly discuss our results while referring to the research questions.

Figure 2.2. Summary of a) factors with impact on experiential learning process, b) approaches to design instructions and c) categories of proven benefits from experiential learning processes.

The *first research question* of this review was to gain insight into the main characteristics of the learning environments as addressed in the literature. The results of this study suggest that the experiential learning can be effectively facilitated by designing learning environments to support theory and practice dialectic relationships. One of the most significant findings were the three pillars of experiential learning: a) learning is a cyclic process related to the "real" world beyond the classroom that mimics the complexity and limitations of professional work (Authenticity); b) learners are supported to construct meaning and critically reflect on dialectic relationship between knowledge and experience (Reflection); and c) learning is situated and mediated in a social context and community of practice (Collaboration). These findings support to some extent Shambaugh and Magliaro's (2001) and Reigeluth and Carr–Chellman's (2009) views on a model for teaching, learning and instructional design.

To address the *second research question*, we intended to better understand the learning processes within Authentic, Reflective, and Collaborative learning tasks. First, we described the ways authentic learning provided real–world context and encouraged students to re– and de–contextualize knowledge within Kolb's the experiential learning cycle. The results show two dominant approaches: a) authentic field trips (supplemented with various learning principles depending on the context of study); and b) problem based learning. Authenticity of learning tasks can be expected to have a positive influence on the development of personal, professional, academic and cognitive aspect of learners. Second, the importance of reflection in higher education, and within domain in our focus is widely recognized. The current review reveals that continued reflection is needed for active knowledge construction (Billett, 2014; Mena Marcos & Tillema, 2006). Many authors suggest that reflection should follow learning as an essential step, so that knowledge can result from experiences (Kember et al., 2008). Third, the relevance of collaboration, as the third pillar of experiential learning, is clearly supported by the current findings. The social context seems to be important for the way in which the transitions between the steps in the Kolb's experiential learning cycle could be supported. The results of our review assert that learners should be encouraged to 1) collectively construct solutions, 2) learn from more experienced peers, and 3) take advantage of professional experience diversity during experiential learning. Having in mind previously acknowledged critics of Kolb's model, it seems important to take into account social aspects of learning to better understand experience. Finally, many suggests that opportunity to reflect and share ideas within a group supports students' deeper knowledge development, promotes developing

scientific argumentation skills, endorses academic grow and improves understanding of experience.

The findings addressing the *third research question* reveal various facilitating and hindering factors that influence the experiential learning process. Literature argued that effective experiential learning does not come from itself, but that a number of conditions must be fulfilled. We distinguish facilitating factors within three categories (Student, Teaching and Learning Environment and Mediating), each with factors such as: a) Task and learning activities; b) Various professional expertise; c) Collaboration and community; d) Guided reflection; and e) Time. Unfortunately the studies failed to explore variables relating to Student characteristics, such as Cognitive skills (e.g. information processing speed, working memory, or the quality of previous schooling), Academic past (e.g. the level of education), and Mediating characteristics with corresponding factors such as self–efficacy, orientation of goals, or self–regulation strategies (Charlier et al., 2015; Reigeluth & Carr–Chellman, 2002).

Another important finding was that effective experiential learning is challenging to organize. A number of researchers have reported factors that may hinder experiential learning processes, such as students’ lack of content knowledge and classroom practice, the struggle to work in teams, the lack of personal contact between team members or fear that peer feedback might influence group harmony. It is important to note that the influence of factors (whether facilitating or hindering) sometimes depends on the context of the study or on the way the learning process is designed.

The *fourth research question* required an overview of possible positive and negative consequences of experiential learning. The literature revealed a variety of advantages of experiential learning. We distinguished four categories of benefits: Personal, Professional, Knowledge and Learning processes. Within the personal group of benefits, the most often noticed factors were categorised as: Motivation and encouragement; Self–development skills; Beliefs, values, attitudes and feeling; and Creativity. Most reported professional benefits were: Better understanding of profession and practice; and Become more thoughtful, reflective and critical. Knowledge benefits deal with learning achievements. Finally, the benefits for the learning process are: Perceived significance of learning and Learning enjoyment; and Collaboration and Community. The literature points out that several factors can hinder the learning process (Students’ lack of knowledge, experience, openness and trust; Lack of personal contact between students, Challenging process of reflection, and Low levels of

authenticity). The amount of negative consequences reported is significantly lower than the number of benefits, however special attention must be paid to them in order to guarantee effectiveness and to facilitate efficiency and success.

It is worth acknowledging that the great majority of learning factors and learning benefits identified in this review emanated from studies exploring applying knowledge in practice. Here we refer to the second paragraph in Section 1, where we briefly describe the pursuit of experiential learning environments to support the contextualization and re–contextualization of knowledge within learning processes (i.e., transfer from theory towards practice). However, research into how experiential learning processes supporting students in building academic knowledge and theories, based on previous practical experiences, is lacking. Our literature set included only two studies (Harford & MacRuairc, 2008; Leijen et al., 2014) that investigated learning processes supporting de–contextualization (i.e. transfer from practice to theory). Consequently, our results reflect (and also depend on) the imbalance between the number of studies exploring re– and de– contextualization. In conclusion, there is agreement across the literature that experiential learning naturally fits with professional learning.

2.4.1 Limitations

Although we employed four perspectives to discuss learning design and to clarify learning outcomes in specific cases, our discussion and argumentation was dependent on information, reports and statements provided by research studies describing designs of learning environments. However, we have tried to illustrate the variety of methods used to activate, structure and understanding experience, and to provide more insights on both a conceptual and practical level. We argue that the characteristics of learning environments and factors identified above could support all masters programmes in higher education in an endeavour to improve education and encourage more experiential learning.

Due to our aim to better understand experiential learning as the main theoretical framework within the domain of interest, the search query for our study focused primarily on clearly stated experiential learning terms. To confirm the integrity of our selected literature we applied an additional google scholar search, and did not find any complementary literature. The question here is whether more empirical articles could have been found if additional search terms had been used. Further research could extend search terms (more research–related search phases accompanied by more specific term relating to experiential learning as introduced in this

study), at the same time keeping control over the experiential approach of studies, in order to get an even broader perspective on the context.

Another limitation of our study is the narrative literature approach and the risk that our interpretations have biased the results (Stes et al., 2010; Vangrieken et al., 2015). Although a more rigidly controlled meta–analysis would have provided more precise and objective results, the diversity of reported data within studies made it impossible for us to use this approach. In order to reveal all significant results as objectively as possible, the research strategies proposed by Petticrew and Roberts (2006) have been used to improve the quality of the review.

2.4.2 Recommendations for future research

Our study raised a few more suggestions for research areas. First of all, future review studies should take into account experiential learning within other domains than education, while retaining the same literature search procedure and data framework as was introduced in this review, so results could be compared.

Another recommendation arose from the imbalance between studies investigating processes of re– and de– contextualization. Moreover, research studies exploring knowledge de–contextualizing processes will help us to distinguish critical factors which influence building academic knowledge on the starting point of experience.

A final recommendation is to investigate the complex relationships between the three pillars of experiential learning as identified. Researching how authentic, reflective and collaborative characteristics of learning environments are bound together and how designing one influences and determines the others is left to empirical research studies that are currently being planned and implemented. Such studies will further explore the optimal level of the mentioned characteristics and factors.

Chapter 3

The mARC instructional design model: theoretical foundations and practical guidelines

This chapter aims to provide more insight on the process of creating and redesigning experiential learning environments and to better understand the complex relationship that exists between the learning environments and experiential learning (considering underlying learning theories). Therefore it present and discuss the development of mARC (more Authentic, Reflective and Collaborative), a three– components instruction model with a set of instructional elements proven to facilitate the re– and de– contextualisation of knowledge. This ends with practical guidelines for using the mARC model to support students in linking learning experience to academic knowledge development within higher education.

This chapter is based on: Radović, S., Hummel, H. G. K., & Vermeulen, M. (2021). The mARC instructional design model for more experiential learning in higher education: theoretical foundations and practical guidelines. *Teaching in Higher Education*, 1–19, DOI: 10.1080/13562517.2021.1872527.

3.1 Introduction

'The necessity of lifelong learning' is a need underneath many educational reforms, government policy plans, and within organisations like the Organisation for Economic Co–operation & Development (OECD, 2018). The growing complexity of the working place and learners' aspirations for acquiring more knowledge have increased the need for continuous learning (OECD, 2019). Recent efforts to improve higher education have often mentioned experiential learning (Coulson & Harvey, 2013; Groves et al., 2013; Lindsey & Berger, 2009). These were seen as a dynamic approach to provide students with both learning experience and academic knowledge (Roberts, 2018; Tynjälä et al., 2003). Kolb (1984) proposed that learning is a process in which the learner goes through steps of concrete experience, reflective observation, abstract conceptualisation, and active experimentation in an iterative manner (Kolb, 1984, 2015). A considerable body of research shows that experiential learning offers the opportunity for learners to develop the ability to apply theory in practical situations (contextualising knowledge). At the same time new knowledge can arise from gaining concrete learning experience and be converted into abstract generalisations (de–contextualising knowledge), but also from applying this new generic knowledge in other learning experiences (re–contextualising knowledge). Learning becomes 'really' experiential only if both processes are addressed (Kreber, 2001). Moreover, Holman, Pavlica, and Thorpe (1997) and Tynjälä, Välimaa, and Sarja (2003) stressed that, while theory and practice shift over time, expand and become entangled, learners are involved in deeper and more meaningful understanding.

Although many scholars mention concreate learning experience as a key factor for their theories and educational development, Buschor and Kamm (2015) point out that educators face many challenges in their attempt to support learners in their efforts to practice both their knowledge and learning experiences. The complexity of experiential learning, together with critics of the Kolb's model, are emphasised in a number of studies (Boud et al., 1993; Castelijns et al., 2013; Roberts, 2018). The most frequently mentioned issues are that experiential cycle does not take into account the social aspects of learning, group learning (Boud & Walker, 1993; Holman et al., 1997) or the need for interaction between individuals. Race's (2014) Ripples Model of Learning identifies the fundamental factors underpinning effective experiential learning as motivation, purposeful intention, and desire to learn. From another perspective, studies criticize absence of methods to support learners' reflection (Boud et al., 1985) and their progress through the learning cycle.

Finally, Beard (2008) noted that although organising experiential learning process is a challenge, it "remains very influential in a pedagogical sense" (p.5). Moreover, whatever the limitations of Kolb's model are, the contribution cannot be underestimated since it "helped move educational thought from the focus of the instructor back to the learner" (Kelly, 1997, p. 4). Despite the growing body of research on different aspects of experiential learning, literature emphasises the need for a better understanding of instructional elements that facilitate the integration of theory, understanding and learning experience (Groves et al., 2013; Matsuo, 2015; Roberts, 2018).

3.2 The present research questions

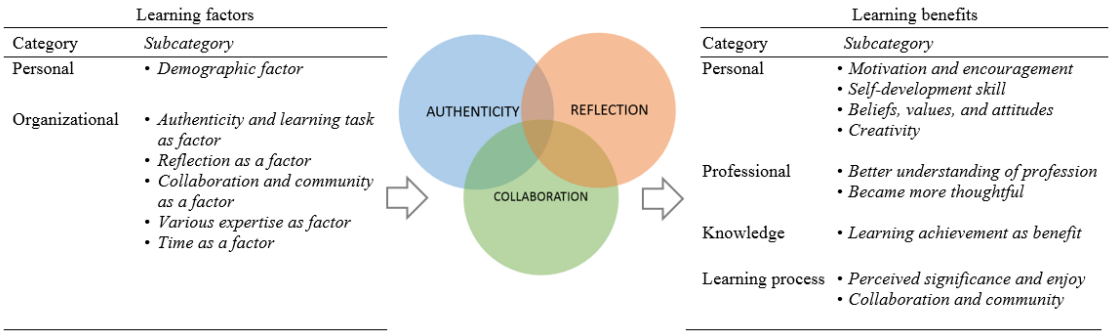
Both concrete experiencing and abstract thinking, being ‘two sides of the same medal’ of learning, are influencing each other through a complex process (Afdal & Kari, 2018; Kreber, 2001). Although a number of variants of experiential learning have been proposed (Bergsteiner & Avery, 2014; Castelijns et al., 2013), how to design such learning process is still not described in the literature. Besides, Coulson and Harvey (2013, p. 403) assert that experiential learning in higher education “requires a degree of structure and planning that is not always required in other forms of experiential learning”. From this standpoint, we aim develop and propose an instructional design model for facilitating more effective experiential learning. The main research questions underlying this article are:

> RQ 1. What are the critical instructional elements in an experiential learning environment that support learners in their re– and de– contextualisation of knowledge (*theoretical foundations*)?
>
> RQ 2. What are the learning design principles that facilitate more experiential learning (*practical guidelines*)?

We followed the methodological procedure of Lee and Jang (2014) and the recommendation of Gustafson and Branch (2002) to develop an instructional design model. They suggest using a combination of theory– and practice– driven approaches (hybrid method). We first pointed out important instructional elements, then described and classified these elements, drew causal relationships between them, and finally provided design guidelines for applying the model (Gustafson & Branch, 2002; Lee & Jang, 2014).

3.3 Pillars, perils and pearls of experiential learning

For our systematic literature review we used narrative evaluation methods (Radović et al., 2021e) to explore the relation between practice and theory. Previous literature on experiential learning is often criticized for mixing research results from various levels of education, ranging from primary school to higher education, and from different domains of learning (Lindsey & Berger, 2009). To facilitate some more profound understanding, our review therefore focused on the masters in the educational sciences domain, in order to carefully isolate and explore all instructional characteristics that are relevant in that context. This approach allowed us to discuss and compare results, bearing in mind the specific educational context from which they emerged. All identified articles were evaluated based on the inclusion and exclusion criteria that were specified in advance (also according to Petticrew & Roberts, 2006).



The review study identified main results which provided us with an overview of important factors for and benefits of experiential learning. First of all, three pillars of experiential learning resulted from the review: a) learning is a cyclic process related to the nature of the "real" world beyond the classroom (Authenticity); b) learners are supported to reflect on knowledge and experience (Reflection); and c) learning is situated and mediated in a social context (Collaboration). These pillars were almost equally encountered across studies, implemented in various settings, with different learning factors and benefits to enhance experiential learning circle (see Figure 3.1).

Secondly, the literature review shows that effective experiential learning does not emerge automatically, but that a number of conditions must be fulfilled first. Within all facilitating and

hindering factors that influence experiential learning process, two groups could be distinguished: Personal and Organisational factors (the full list of subcategories can be found in Figure 3.1). Facilitating demographic factors include age, previous education, level of education, and work experience (Hagevik et al., 2012). This first group also includes personal characteristics as integrity, openness, and commitment (Chi, 2013). The Organisational factors group includes factors mainly related to the prevailing characteristics of learning tasks and processes (Korkko et al., 2016). Identified factors within this group included different aspects of authenticity, reflection, collaboration and community as essential characteristics of the learning processes. Moreover, various expertise and feedback during learning process was seen as factor for learning (Korkko et al., 2016). Some studies argue (Hagevik et al., 2012; Korkko et al., 2016) that the variety of previous experience between students can influence learning and support reflection in groups. The final subcategory mentions time (prolonged reflection, reflection over longer time period and time spent during reflective writing) as a facilitating factor (Leijen et al., 2014).

Thirdly, the review revealed a variety of benefits of experiential learning. Four categories of learning benefits could be distinguished: Personal, Professional, Knowledge and Learning processes (see Figure 3.1). Personal benefits reported include four subcategories: Motivation and encouragement; Self–development skill; Beliefs, values, attitudes; and Creativity (Chi 2013). Students were reporting to be more motivated, to feel better as a learner, and to believe in the benefits of the course. Most reported professional benefits of experiential learning are placed in two subgroups: Better understanding of profession and practice; and Becoming more thoughtful, reflective and critical (Sutherland & Markauskaite, 2012). Knowledge and Learning achievement benefits reported include developing deeper understanding, broader knowledge, and having greater achievement and success (Hagevik et al., 2012; Sutherland & Markauskaite, 2012).

From literature review it also appears that effective experiential learning is challenging to organize. Main factors mentioned as hindering include the struggle to work in groups, relation between team members, and lack of trust which diminished group harmony (Leijen et al., 2014). Furthermore, reflection without guiding lead to the feeling that the process is difficult and less beneficial (Leijen et al., 2014). The amount of negative consequences reported were significantly lower than the number of benefits, however authors pointed out that special attention must be given to this group of factors in order to assure effectiveness of the learning.

3.4 The mARC instructional design model

The aim of this article is to produce the instructional model to serve both as a conceptual tool providing scholars with an understanding of inter– related instructional elements proven to facilitate experiential learning, and as a procedural tool that guides educators while designing and revising learning environments (Lee & Jang, 2014). The mARC model does not claim to portray all instructional elements that could influence learning, but defines a set of core elements that have proven to significantly strengthen the ties between theory (abstract knowledge) and practice (concrete experience).

The hybrid method used to design the instructional model allowed us to first investigate empirical results to extract instructional elements and learning design principles (Gustafson & Branch, 2002; Lee & Jang, 2014). The point of departure for this step was grounded in the review study (Radović et al., 2021e) that argued facilitating and hindering factors that influence experiential learning process. Further on, we analysed those elements and clustered them according to the identified pillars of Authenticity, Reflection, and Collaboration. Finally, the underlying learning theories were used to explore relations among instructional elements, providing more clarity on their learning impact and mutual interdependencies. The instructional elements within each pillar of the model were further sub–clustered according to their influence 1) locally within the pillar – *fostering role*, and 2) in relation to the whole model – *strengthening role*. Instructional elements with fostering roles are seen to complement the pillar they belong to: the 'pearls' of their underlying learning theory. Instructional elements with strengthening roles are to relate the pillar with the rest of the learning model, making the learning instructions complete (see Figure 3.2).

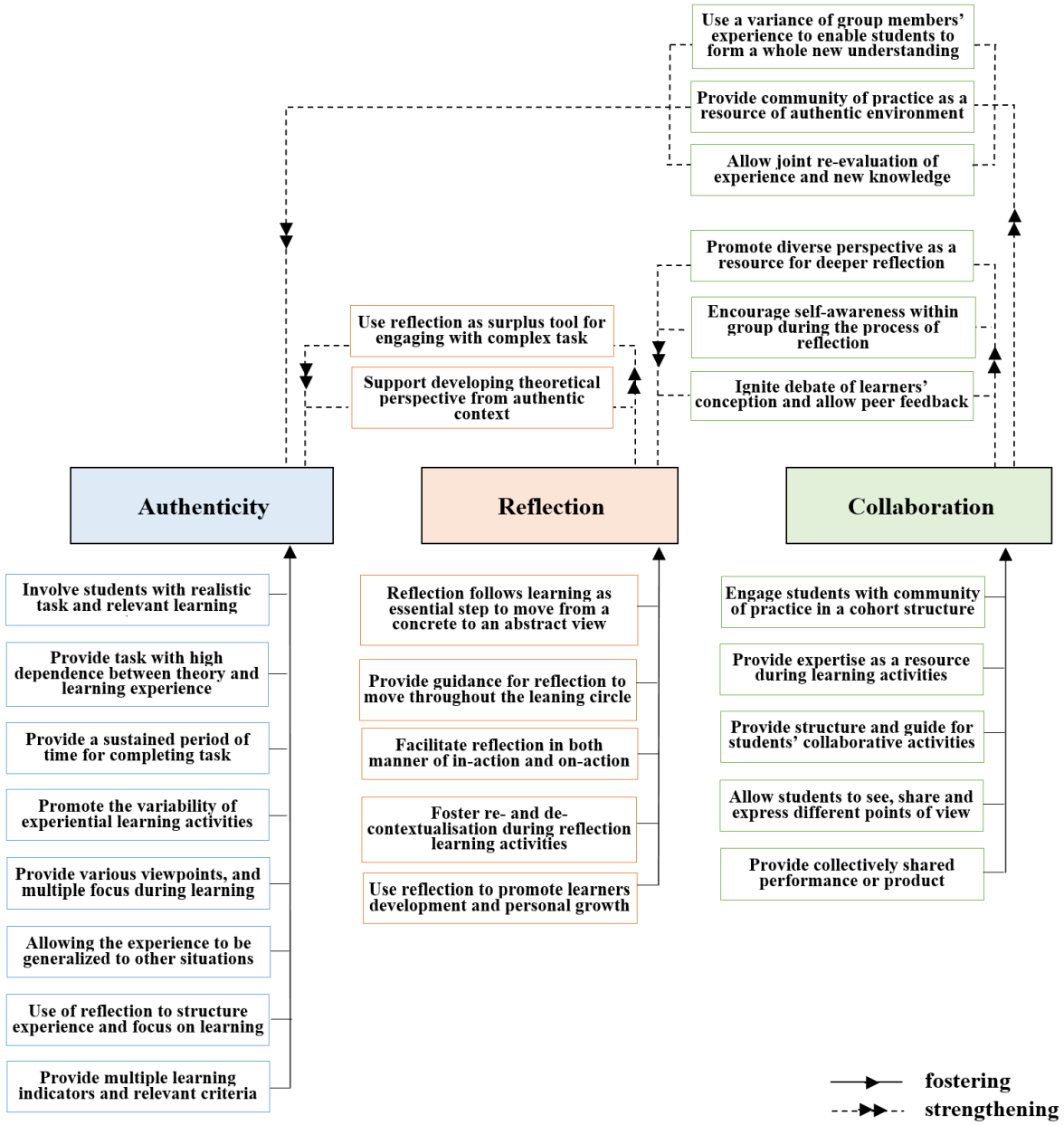


Figure 3.2. The mARC instructional design model.

Regarding the conceptual aspects of the mARC model, in the next subsections each pillar of the model will be described, as well as their most critical elements, and their founding learning theory, respectively for authenticity (subsection 4.1), reflection (subsection 4.2) and collaboration (subsection 4.3). This will be followed with a presentation of the procedural aspects of the model and more practical (design) guidelines (subsection 4.4).

3.4.1 Authenticity as pillar of the mARC model

The idea that learning activities need to be more authentic and work–oriented was recognized during the mid–1980s. Over the past decades, authenticity has been identified as a way to support knowledge re– and de– contextualization (Ashford–Rowe et al., 2014; Herrington & Oliver, 2000; Ursin & Paloniemi, 2019; Villarroel et al., 2018). According to Gulikers et al. (2008) authenticity is defined and determined by the extent to which professional situations, reassembled in a learning environment, are relevant to the learner. Wald and Harland (2017) assert that meaningful learning is best placed in the context within which the learning experience and knowledge can emerge. Authentic tasks provide an outline to encourage both re– and de–contextualising processes and enlarge students' capacity to integrate understanding with practical learning experience.

However, designing authentic learning environments seems to be challenging with many barriers impeding successful transfer of learning and effective learning processes (Tynjälä et al., 2003; Villarroel et al. 2018). In Table 3.1, critical elements from the Authenticity pillar of the model are described with respect to the review study's findings on facilitating more experiential learning.

Table 3.1. Brief introduction and description of critical elements of Authenticity.

Elements	Elements Description
Involve students with realistic tasks and relevant learning (Wenzlaff & Wieseman, 2004).	The first form of 'realism' is when students are able to identify relations between learning outcomes and learning process. Learning process should question student knowledge and exercise their higher levels of thinking, while focused on relevant learning outcome, product or performance (Ashford–Rowe et al., 2014; Wald & Harland, 2017). Rather than forcing students to remember procedures and facts (Elvira et al., 2017).
Provide tasks with high dependence between theory and learning experience (Celik, 2012).	The second form of 'realism' is the presence of a real context (Gulikers et al., 2008) that reflects the complexity of real work settings (Villarroel et al., 2020). Professional situations, reassembled in a learning environment engage learners in more meaningful learning (Herringtond & Kervin, 2007). More importantly, learners' perceptions of the dependence between knowledge and experience facilitate the processing of learning experiences at a deeper level of reasoning in order to construct theory (re– contextualisation).
Provide a sustained period of time for completing task (Bain et al., 1999)	Solving complex tasks over a longer period of time has the potential to increase the ability of students to think more critically, reason effectively, and build understanding while looking at learning experience

Elements	Elements Description
	(Bain et al., 1999; Ursin & Paloniemi, 2019). Moreover, sufficient time is needed for learners to be able to see and investigate all the connections between task, learning experience and academic context (Ashford–Rowe et al., 2014; Elvira et al., 2017).
Promote the variability of experiential learning activities (Aiken & Day, 1999)	Students should move through experiential learning cycle without consistency and fixed patterns in order to see the complexity of concepts that need to be understood (Elvira et al., 2017; Herrington & Kervin, 2007). Moreover, when learners are challenged to associate between various and different learning experiences, it is likely that a coherent and more structured understanding will be developed.
Provide various viewpoints on, and multiple foci during learning (Hagevik, 2012)	Herrington and Kervin (2007) pointed out that providing opportunities for learners to explore different perspectives during learning can support explicating procedural knowledge into conceptual, and vice versa. In addition, different angles or approaches during learning processes provoke a wide range of cognitive strategies, such as "repetition, elaboration, analysis, organisation or deduction" (Elvira et al., 2017, p. 195).
Allow the experience to be generalized to other situations (Howard et al., 2014)	Learners should be provided with a mechanism to go beyond the reproduction of fragments of learning experience to achieve a deeper understanding (de–contextualisation) (Villarroel et al., 2018). Such a procedure can lead to further use of knowledge, or re–contextualisation to other, unrelated situations (Elvira et al., 2017). However, something learned in one situation is often not easy to transfer to other problems, situations and contexts (Tynjälä et al., 2003).
Use reflection to structure experience and focus on learning (Korkko et al., 2016)	Reflection should be used as a mechanism to connect learning experience with a broader context of knowledge, in an endeavour of making new understanding or solving complex tasks (Slavich & Zimbardo, 2012). Elvira et al. (2017, p. 196) state that through reflection "tacit knowledge can become explicit".
Provide multiple learning indicators and relevant criteria (Cowan, 2012)	Learning indicators should be a true representation of the criteria the learner has to meet in real–life or professional carrier (Herrington & Oliver, 2000). Moreover, students should be able to estimate their effort with desired standards and to plan their learning activities using skills of self–monitoring, planning and self–evaluation (Elvira et al., 2017).

3.4.2 Reflection as pillar of the mARC model

As cited by many, pioneer in the field Dewey (1933) defined reflection as the active, persistent and careful consideration of any belief or supposed form of knowledge in the light of the grounds that support it and the further conclusion to which it tends. In addition to Dewey, a great theoretical contribution to the theory of reflection was provided by Schön (1983). He

defined the strategies of reflecting–in–action (thinking about doing something while doing it) and reflecting–on–action (thinking after an action has been done).

As reflective learner, one can develop a deeper understanding of one's own experience and link it to academic theories during the course of active reflection (when moving through the processes: experiencing, reflecting, thinking, and acting) (Boud et al., 1985; Kolb, 2015; Larrivee, 2000). Hence, the importance of reflection in higher education, and across disciplinary fields is widely recognized (Mezirow, 1981; Slavich & Zimbardo, 2012). However, critical thinking will neither occur spontaneously nor is it a simplistic process (Boud et al., 1985). In Table 3.2, the critical elements from the reflection pillar are described in respect to the ways in which they enhance more experiential learning and support both processes of re– and de– contextualization.

Table 3.2. Brief introduction and description of critical elements of Reflection.

Elements	**Elements Description**
Use reflection as surplus tool for engaging with complex tasks (Bain et al., 1999)	To develop coherent knowledge, Elvira et al. (2017) propose various metacognitive/reflective strategies to engage with complex tasks and concepts. It is reflection that take a learner from one part of the authentic task to another. Moreover, it is the process that brings de–contextualised knowledge to the next complex situation with a deeper understanding of its origin (Ashford–Rowe et al., 2014).
Support developing a theoretical perspective from an authentic context (Hramiak, 2009)	Dewey (1933) stated that the purpose of reflection is to discover connections between cause and effect, in order to gain new understanding. In that respect, reflection can support de–contextualisation by making the learner more aware of their own knowledge and promoting a critical evaluation of the experience. In addition, as noted in Elvira et al. (2017, p. 192), learners should be guided to "see the complexity of knowledge" and be instructed to question their ideas.
Reflection follows learning as essential step to move from a concrete to an abstract view (Korkko et al., 2016)	Reflection should follow learning experience as an essential step. Dewey (1933) pointed out that no experience has meaning without reflection (Kreber, 2001). It is the process in which students try to acquire abstract and general understanding from concrete learning experience (Boud et al., 1985; Larrivee, 2000). Additionally, doing so, learners practice a range of cognitive processes such as summarising, analysing, deduction and elaboration (Elvira et al., 2017).
Provide guidance for reflection throughout the learning circle (Leijen et al., 2014)	Guided reflection activities enable students to find the way to structure perception and understanding. Literature indicates that reflective thinking is not necessary happening spontaneously and should almost always be explicitly encouraged (Boud et al., 1993; Coulson & Harvey, 2013). Guided reflection can support learners to understand knowledge

Elements	Elements Description
	and experience during both re– and de– contextualisation processes (Gibbs, 1998).
Facilitate reflection both in–action and on–action (Harford & MacRuairc, 2008)	Developing a coherent knowledge takes time and requires focusing on a specific sub–components of the learning process in order to witness relations between theory and experience (Elvira et al., 2017). Reflection–in–action (Schön, 1983) should follow the learners in their efforts to adapt their thoughts and ways of thinking at the time they emerge into concrete experiential activities. Reflection–on–action (Schön, 1983) is the process of examining experience at some distance from the event.
Foster re– and de–contextualisation during reflection on learning activities (Rawlins & Kehrwald, 2014)	Reflective learning offers students the opportunity to 1) develop the ability to apply theoretical knowledge in the light of practical situations, 2) create new understanding by gaining experience and converting it into generalisation, and 3) further apply knowledge to create other experiences (Boud et al., 1985; Tynjälä et al., 2003).
Use reflection to promote learners' self–development and personal growth (Leijen, 2014)	Reflection will not only challenge learning experience and developed knowledge, but its influence goes beyond cognition (Dewey, 1933). It is a process in which learners identify personal assumptions and question their meaning. Students should be aware of their beliefs and actions as a basis for personal growth and self–development (Gibbs, 1998; Ursin & Paloniemi, 2019).

3.4.3 Collaboration as pillar of the mARC model

The belief that knowledge is constructed through interaction with others is not new, but gains increasingly more attention in educational research and practice (Lave & Wenger, 1991; Teräs, 2016; Weinberger & Fischer, 2006). Collaborative learning refers to an instructional strategy in which learners work actively together in groups with shared aims (Johnson & Johnson, 2009).

According to the extensive literature, learning in a group can be organized in various ways, with different learning mechanisms, interactions and learning situations. While Wald and Harland (2017) assert that the authenticity should be socially constructed, Buschor and Kamm (2015) further point out that learners should be encouraged to collaboratively reflect on authentic experience. Furthermore, many researchers asserted that peer reflection supports engagement with learning tasks, promotes developing scientific argumentation skills, endorses academic growth and improves understanding of experience (Weinberger & Fischer, 2006). In Table 3.3, essential critical elements from the collaboration pillar are described in respect to the ways in which they enhance more experiential learning.

Table 3.3. Brief introduction and description of critical elements of Collaboration.

Elements	Elements Description
Use a variance of group members' experience to enable students to form a new understanding (Cowan, 2012)	Tynjälä, Välimaa, and Sarja (2003) stress that the others persons' experience in a group can be used effectively to promote interdependence and support the development of shared understanding. However, too much variation leads to no learning (Castelijns et al., 2013). Van den Bossche et al. (2011) argue that only if there is a critical stance regarding each other's contributions, ideas and comments there will be construction of a new understanding.
Provide a community of practice as a resource of authentic environment (Hagevik et al., 2012)	As noted by Sutherland and Markauskaite (2012) engaging learners with a community (Lave & Wenger, 1991) can be a mechanism to afford authentic environment for involvement in various aspects of theory and practice. In this context, community can serve as environment for practicing both professional development (Castelijns et al., 2013) and academic skills (Wald & Harland, 2017; Weinberger & Fischer, 2006).
Allow joint re–evaluation of experience and new knowledge (Chi, 2013)	Recognizing that there is no one way to answer complex learning tasks is an important element in supporting authentic and reflective practice. Moreover, joint re–evaluation of experience and understanding, according to Lockhorst (2004) can lead to new knowledge.
Promote various perspectives as a resource for deeper reflection (Harford & MacRuairc, 2008)	Having different perspectives within a group of learners can be used to expand each-others' thoughts and ideas about a topic (Boud et al., 1985; Coulson & Harvey, 2013). Promoting diverse experience as a source of deeper reflection can increase the potential benefits of learning (Herrington & Oliver, 2000; Mezirow, 1981). Moreover, making students' tactical knowledge explicit within a group of learners evokes development of different metacognitive strategies (Elvira et al., 2017).
Encourage self–awareness within groups during the process of reflection (Wenzlaff & Wieseman, 2004).	For Lave and Wenger (1991), the learning process is more than just gaining experience, skills and knowledge. Through the process of collaboration, not only experience and knowledge are explored and deconstructed, but changes take place beyond cognition. Learners develop their identity in the relationship to a group and expand self–awareness (Ashford–Rowe et al., 2014), self–esteem, confidence, and intrinsic motivation (Ursin & Paloniemi, 2019).
Ignite a debate on learners' conceptions and allow for peer feedback (Swaggerty & Broemmel, 2017).	Several authors point out that peer feedback can lead to improvement of both processes re– and de– contextualisation (Elvira et al., 2017). It's a method to help students to monitor and compare their learning progress, concepts development and understanding. Peer feedback can stimulate a debate (Castelijns et al., 2013), challenge each-others' reasoning (Johnson & Johnson, 2009), and help students to move through experiential learning.
Engage students within a community of practice in a cohort structure (Seed, 2008)	During learning in a cohort structure, learners search for insights and jointly construct new knowledge that ultimately leads to strengthening involvement in complex learning (Castelijns et al., 2013; Tynjälä et al.,

Elements	Elements Description
	2003). Opportunity to have a dialogue is a strategy to develop new knowledge together (Castelijns et al., 2013). Elvira et al. (2017) call that 'inexpressible knowledge' – finding a way within a group to convert procedural knowledge into conceptual knowledge.
Provide different expertise as a resource during learning activities (Cowan, 2012)	Tasks that require individuals to work together to achieve goals create what Johnson and Johnson (2009) call "positive interdependence". This interdependence becomes even more evident when group members have different disciplinary expertise (Noroozi et al., 2013). Although diversity in such interaction leads to new 'abstract or more complex' insights, on another hand to big difference and variations may hinder learning (Castelijns et al., 2013).
Provide structure and guidance for students' collaborative activities (Cannon & Scharmann, 1996)	Guidance of students' collaborative activities is proved to be a promising approach to coordinate various learner processes and promote learning (Weinberger & Fischer, 2006). Noroozi et al. (2013) point out, for example, that groups of learners during the collaboration often require special support, such as coordinating joint activities.
Allow students to see, share and express different points of view (Chi, 2013)	Learners are more inclined to contribute to the creation of relation capital if there is a culture of openness and trust in which everyone has a voice and is listened to. Castelijns, Vermeulen, and Kools (2013) argued that talking openly with peers about different views, opinions and understanding positively influence learning in group.
Foster collectively shared performance or product (Howard et al., 2014)	Members interdependency is increased by sharing the same goal and responsibilities for accomplish a task (Scardamalia & Bereiter, 2003). Van den Bossche et al. (2011, p. 284) stressed that "the essence of collaboration is hereby a process of building and maintaining a shared conception". These 'conceptual artefacts', as Engeström and Sannino (2010) call them, include the sharing of new knowledge, but also jointly developed outcomes as collectively shared activities and understanding (corresponding to cognitive social capital).

3.4.4 Practical (design) guidelines

Lee and Jang (2014) suggest a different way to use an instructional design model for designing learning experiences, courses, and educational content. The vast majority of the models involve a number of instructional components (strategies) to be considered during one complex design phase (applying a cumulative approach). In contrast to these methods, the mARC model suggests shifting the design focus across three stages – with different foci on the pillars of Authenticity, Reflection and Collaboration (applying an iterative approach, see Figure 3.3). Each stage should include all five phases of the ADDIE framework (Analysis, Design, Development, Implementation, Evaluation).

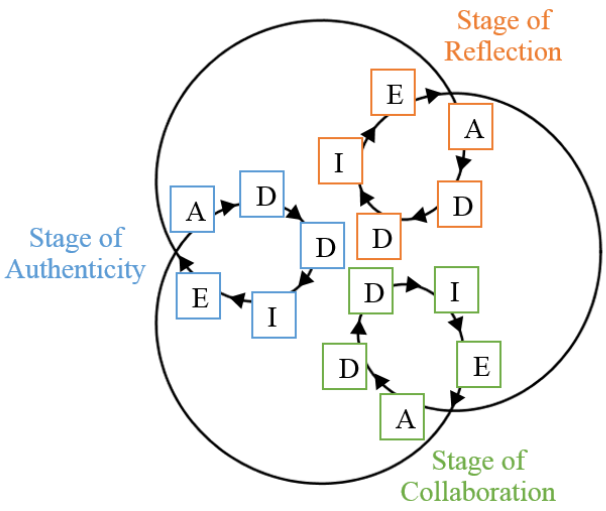


Figure 3.3. Three stages of learning environment redesign cycle according to three pillars of the mARC model (each including phases of the ADDIE framework).

The following nine practical guidelines can be derived from the review study and the mARC model as we have presented, which are intended to assist practitioners in designing more experiential learning.

To ensure that the learning environment reflects the complexity of what needs to be learned, with new knowledge emerging from experience and being transforming into understanding, practitioners need to assure that *1) Students are enabled to appreciate and engage with the real–world context*. This can be achieved, for example, by *2) Providing students with various viewpoints on the learning process through different learning strategies and methods*, or by *3) Engaging students within a community of practice in a cohort structure.* Furthermore, it may be necessary to ensure that learners have opportunity to learn from each other's differences by assuring the *4) Engagement of students in discussing and debating a topic, exchanging ideas, and expressing different points of view.*

We have argued that the learning context is often considered by students as being non–authentic or 'not important'. Therefore, during the learning design process, we have to consider the perception of the learning process itself. According to the model, practitioners should assure *5) Students using prolonged, structured and guided critical reflection* as an essential step in engaging students with the meaning of the experience. In particular, this guideline is seen as a useful strategy to *6) Support students in developing a theoretical perspective from an authentic context,* and to further elaborate upon understanding and experience. In addition, we argue that

the learning environment has to provide opportunities for both processes of re– and de–contextualization. In meeting this challenge, it may be necessary to consider 7) *Students using diverse learners' perspectives as resources for critical reflection* and support for the growth of shared understanding within a cohort.

Finally, the last two overarching practical guidelines derived are to 8) *Gradually design a complex structure of the learning environment and redesign it in each subsequent stage of the design process*, including elements from all three pillars of experiential learning (Authenticity, Reflection, Collaboration) in the learning design as 9)*'Fostering elements' of the pillar and 'strengthening elements' in relation to the whole model and all of its components.* By following these guidelines, the mARC model can make an important contribution to strengthening the links between theoretical knowledge and practical experience within learning.

3.5 Conclusion and discussion

Concrete learning experiences and more abstract thinking are influencing each other through a complex process (Afdal & Kari, 2018). Yet, higher education institutions are often criticised for "failing to embrace experiential learning methods" (Groves et al., 2013, p. 555). While literature identifies multiple benefits of experiential learning, designing such an environment and adapting it to the needs of students and to the learning context is complicated. The point of departure for this article was defined by the results from our review study (Radović et al., 2021e), the theory of experiential learning (Coulson & Harvey, 2013; Groves et al., 2013; Kolb, 1984), and the concepts of authenticity, reflection, and collaboration. Although the model is based on research specifically focused on experiential learning in the domain of the Masters in Educational Sciences, we have studied broad learning theories to further craft the model to enable wider applicability. At the same time this article contains a number of points for consideration.

First and foremost, the mARC model is introduced as a complementary model to experiential learning model of the Kolb (1984). While the Kolb's model describes the process of transforming experience and knowledge, the mARC model provides structure that allow an effective experiential learning environment to be developed. Moreover, the mARC model indicates different instructional elements and how they can be used to strengthen the links between learning and practicing (in both directions, from theory to practice and vice versa).

Second, the implication from the model suggests manifold use of critical elements, both locally within each pillar of the model (fostering role), and globally in relation to the model as a whole (strengthening role). Furthermore, this article clearly stressed the important roles of reflective and collaborative learning activities, alongside authentic learning activities. Reflective learning activities are not only seen as an extra layer of complexity, but also necessary to reinforce deeper learning and ties between theory and practice. The role of the critical elements of Collaboration proved to offer a number of advantages, and places experiential learning environments within a social context and in community of practice. All three pillars should be involved during learning design and revising in order to develop complexity and to foster re– and de–contextualisation of knowledge.

3.6 Recommendation for further research

Future qualitative and quantitative research studies may examine and evaluate the influence of the critical elements described in the mARC model. We propose educational design research where the context and domain of learning can be controlled during the entire processes of learning design, redesign, and evaluation. Although the mARC model is depicted as a three–step iterative process, this does not mean that after three cycles of iteration the mARC model loses its applicability. To facilitate the pursuit of more experiential learning, it is probably necessary to continue use the model with many more cyclical iterations.

It is recommended that scholars and educators use the mARC model according to structure we described (in the process we earlier called iterative approach). However, it would be interesting to witness the results of using the mARC model in a more cumulative approach – during just one stage of development. This approach would allow scholars to decide and attribute particular components of the model. We believe that this would be possible, since the links between fostering and strengthening elements within the model are clearly highlighted (see Figure 3.2, and explanations in Section 4). However, the evaluation of particular elements and their impact on the learning process are more complicated to achieve in less controlled settings.

A final recommendation that arose from the article is that too much authentic, reflective and collaborative learning activities might paralyse, and too little might inhibit learners' growth. An important issue for scholars using the mARC model will be in finding the right volume, combination and implementation of these instructional elements in providing the optimal level of support for learners to gain academic skills and practice knowledge in an authentic context.

Chapter 4

An investigation into different levels of authenticity

The aim of this chapter is to examine to what extent an authentic learning environment supports master students in both processes of re and de-contextualisation. Qualitative and quantitative research methods were used to evaluate the impact of learning environments that differed on the level of authenticity (less and more authentic). Participants described both learning environments as being instructive and realistic. Strong correlations between motivation for learning, perception of authenticity and perception of experiential learning were found. Results suggest that more authenticity seems to 1) facilitate experiential learning, and 2) strengthen the ties between theory and practical learning experience. Additional implications for including reflective and collaborative elements to further support learning are discussed.

This chapter is based on: Radović, S., Firssova, O., Hummel, H. G. K., & Vermeulen, M. (2020). Strengthening the ties between theory and practice in higher education: an investigation into different levels of authenticity and processes of re– and de–contextualisation. *Studies in Higher Education*, 1–16, DOI: 10.1080/03075079.2020.1767053.

4.1 Introduction

For teachers and various educational professionals, lifelong learning is considered important for improving knowledge and career advancement (OECD, 2019). Westbury et al. (2005) emphasise that in educational and professional programmes theoretically and practically oriented courses are intertwined. The perspective on the learning process over time might influence the division between educational 'theory' and 'practice' (Cochran-Smith & Lytle, 1999; Oonk, 2009; Stenberg et al., 2016; Westbury et al., 2005). A series of articles studied this dichotomous approach in, for instance academic and reflective theory (Smith, 1992), public and personal theory (Eraut, 1995), knowledge-for-practice and knowledge-in-practice (Cochran-Smith & Lytle, 1999), academic and practical knowledge (Even, 1999), and practical judgement' and epistemic theory (Korthagen & Kessels, 1999). To this issue, Hegender (2010, p. 151) adds that knowledge can be described as propositional ("knowledge that exist regardless of direct contact with a specific situation") and procedural ("knowledge that can only be expressed through procedures in a certain context with a clear intention to handle a specific situation").

The effect of constructivist and social-constructivist thinking caused "a shift from a *division between educational theory and practice* to a view of *theory and practice that exist in a dialectic relation*" (Orland-Barak & Yinon, 2007, p. 957). Moreover, the dual ties between theory and practice become recognised as important for any contemporary higher education programme and research initiative (Leinhardt et al., 1995; Oonk, 2009). Leinhardt et al. (1995, p. 404) acknowledge that the development in both directions (from theory to practice, but also from practice to theory) is necessary: "We have proposed that university [ies] should take on the task of helping learners integrate and transform their knowledge by theorizing practice and practicing theory".

4.1.1 Experiential learning

Recent efforts to provide learners with both concrete experience and theoretical knowledge, often mentioned the concept of experiential learning (Larsen et al., 2017; Roberts, 2018). Building on the works of 20th century noteworthy scholars, Kolb (1984) stated that learning is the process of four cyclic steps: concrete experience (CE), reflective observation (RO), abstract conceptualisation (AC) and active experimentation (AE). In this way learners get the opportunity to apply knowledge to a new experiences (re- contextualizing knowledge, AE, CE).

At the same time, new knowledge can arise from gaining concrete learning experience and be converted into abstract generalizations (de-contextualising knowledge, RO, AC) (Hennissen et al., 2017), but also from applying this new generic knowledge in other learning experiences (re-contextualising knowledge, AE, CE) (Lindsey & Berger, 2009; Orland-Barak & Yinon, 2007). This process represents a learning cycle where the learner may begin at any stage, but must follow each the sequence of four steps (experiencing, reflecting, thinking, and acting). Holman et al. (1997) and Tynjälä et al. (2003) stressed that this way learners will achieve deeper and more meaningful understanding.

According to many researches, authenticity forms the core of pedagogic approaches that stimulate relations between concrete learning experience and knowledge (Ashford-Rowe et al., 2014; Gulikers et al., 2004; Lautenbach, 2014; Villarroel, 2018). This is further confirmed by a review study by Radović et al. (2021e) that found elements of authenticity to be essential for designing experiential learning environments. Authenticity in learning is defined by the extent to which professional situations and context are reassembled in the learning environment (Ainsworth et al., 2012; Gulikers et al., 2004, 2008; Newmann et al., 1995; Roach et al., 2018). This may include a physical or virtual environment with all complexity and limitations of professional context (Gulikers et al., 2004; Reeves et al., 2002). However, authentic learning happens when learners use professional tools, knowledge and skills, when imitate behaviour of experts and develop relevant outputs. Gulikers et al., (2004, 2008) discuss five dimensions of authenticity that need to be reflected in the learning environment, namely 1) *the task* that resembles the complex inquiry; 2) *the physical context* that reflects the way knowledge, skills, and attitudes will be used in professional practice; 3) *the social context* that considers social processes that are present in real-life contexts; 4) *the assessment* that involves multiple indicators of learning; and 5) *the criteria* based on standards used in the real-life situation.

While authenticity provides students with real world resources and professional tools, it can also support students to develop knowledge by generalising professional situations. In that respect, Radović et al. (2021e) point out elements of authenticity that need to be considered when designing learning that facilitates processes of re- and de- contextualisation. Their mARC instructional model (more Authentic, Reflective, and Collaborative) suggests that the design of authentic learning should include: *1) tasks with a high interdependence between theoretical inquiry and concrete learning experiences* (reflecting the complexity of professional situations); to *2) demonstrate skills and knowledge by creating a significant product and build*

understanding; over *3) a sustained period of time*; to support *4) the variability of experiential learning activities without rigidness of the fixed learning patterns*; in order to *5) elicit higher order thinking and stimulate a wide range of cognitive strategies* (including elaboration, analysis, organisation or deduction). While authentic tasks need to be complex enough to challenge learners, the learning process furthermore should include: 6) *shared work and collaboration activities* with peers and community of practice, to mimic activities of experts and professionals; *7) theoretical knowledge as a tool to understand a concrete learning experience (re-contextualisation)*; and should ensure that *8) students engage in generalisation processes in order to associate meaning from experience with a broader context of knowledge (de-contextualisation)*. By further explaining these guidelines, Radović et al., (2021e) stress the importance of strengthening the ties between theory-based courses and practice learning experience.

4.1.2 The pearls and perils of authenticity

Over the past years, numerous studies revealed the benefits of authenticity. They report that authentic learning maximises student engagement (Herrington & Kervin, 2007; Larsen et al., 2017), motivation for learning and feelings of being prepared for future profession (Gulikers et al., 2008; Villarroel, 2018). However, engagement occurs if the students see the relevance beyond their learning activities (Herrington & Kervin, 2007; Lautenbach, 2014). Another benefit described is that students report enhanced self-efficacy and feelings of enjoyment (Aiken & Day, 1999; Ernst, 2013). Finally, authentic learning tasks foster students to grow and develop their knowledge, skills, and critical thinking (Herrington & Oliver, 2000; Hramiak et al., 2009).

However, designing authentic learning environments presents certain challenges (Villarroel, 2018). There are several perils which may hinder integrating professional situations and fail to use (teach) experts skills within a formal higher education setting (Ashford-Rowe et al., 2014; Lautenbach, 2014; Strobel et al., 2012). Gulikers et al. (2004, 2008) and De Bruyckere (2017) assert that authenticity is a subjective concept, placed in the eye of the beholder. Empirical research has shown that it could be difficult for learners to structure experience and focus on developing understanding (Leijen et al., 2014) and outputs relevant for a professional community (Strobel et al., 2012). Similarly, hindrances occurred when programs did not provide "real" experiences (Aiken & Day, 1999; Larsen et al., 2017; Lautenbach, 2014) or

when students perceive learning as being too time and energy consuming (Hramiak et al., 2009). The challenging aspects of authenticity are also reflected in the fact that the effects of authenticity depends on the way the learning process is designed (Radović et al., 2021e).

4.2 Research questions for this study

The research reported here departs from two key postulates when designing authentic learning environments, and considers all the "pearls and perils" of authenticity. The first postulate is that aligning the learning task with the professional proximity can be done based on Gulikers et al.'s (2004) five-dimensional framework. The second postulate is that instructional elements of authenticity, distilled from the mARC model, can be used to enhance both processes of re- and de- contextualisation within experiential learning (Radović et al., 2021e). Both the framework of Gulikers et al. (2004) and the mARC model of Radović et al. (2021f) argue that authenticity can be seen as a continuum and not as a dichotomy.

This implies that learning environments can be less or more authentic. Therefore, to improve our understanding of what the concept of authenticity entails in an academic settings, and how it relates to the concept of experiential learning, a study was set up compare learning environments in which authenticity was implemented differently (a less and more authentic learning environment). Four research questions were addressed:

RQ 1. Are different levels of authenticity related to academic performance?

RQ 2. Are different levels of authenticity related to motivation, enjoyment, perceived competences and usefulness, and perception of authenticity?

RQ 3. Are different levels of authenticity related to students' engagement into re-contextualisation (AE & CE) and de-contextualisation (RO & AC)?

RQ 4. Are various demographic characteristics related to motivation, perception of authenticity, experiential learning, and academic performance?

4.3 Method

To investigate our research questions, we used triangulation of both quantitative and qualitative research methods with respective statistical techniques. A less and more authentic learning

environments were designed (to be further explained in 3.3 Context of the study) and participants could choose one of the designs. Multiple data sources were used: course academic report assessment as a measure of academic performance; a post-test questionnaire with measures on motivation, perception of authenticity and experiential learning; and debriefing activities to get more qualitative insight in the learning process and opinions of participants. Ethical approval for this study was granted by the Ethics Review Committee of the Open University of the Netherlands.

4.3.1 Participants

The study was situated in the first of three core courses of a distance learning Master of Educational Sciences program. The program is designed for professionals in education, mainly teachers who seek an academic masters' degree and combine work and study to attain this goal.

Participants of this study were students of one cohort who completed the course on time and gave written consent to participate in the study (n = 37). Table 4.1 provides a comprehensive picture of the demographics collected with a questionnaire (six students did not fill in the questionnaire). Participants were divided into two groups based on their choice, further specified as LA (Less Authentic condition) and MA (More Authentic condition) groups as the learning task differed in the extent of authenticity incorporated in course design

Table 4.1. Students' demographic information.

Category	**LA (n = 19)**		**MA (n = 12)**		**Total (n = 31)**	
	n	**%**	***n***	**%**	***n***	**%**
Gender						
Male	1	5%	3	25%	4	13%
Female	18	95%	9	75%	27	87%
Previous level of Education						
Professional bachelor/master	11	58%	11	92%	22	71%
University bachelor/master	8	42%	1	8%	9	29%
Experience in professional work						
0-5 years	5	26%	2	17%	7	23%
5-10 years	4	21%	2	17%	6	19%
>10 years	10	53%	8	66%	18	58%
Expertise during professional work						
Teaching professional background	13	68%	7	58%	20	65%
Age	***M***	***SD***	***M***	***SD***	***M***	***SD***
In years	35.05	8.32	40.83	9.40	37.3	9.19

Note: LA = Less Authentic group; MA = More Authentic group; *M* = Mean; *SD* = Standard deviation.

4.3.2 Measuring instruments

Academic performance

Effect on academic performance is measured through course assessment of students' final assignment (writing an academic report). Course criteria assess the extent students apply theory to practice and the extent they extract and report theoretically relevant meanings from a situation in practice. It includes three segments: a) the quality of reported research (seven criteria); b) the quality of demonstrated theoretical knowledge (four criteria); and c) academic writing (four criteria). A sum formed the final grade. Scoring was conducted by one teacher after five teachers had calibration sessions on the first three papers.

The questionnaire

Based on the research questions, a questionnaire made of 42 items was constructed (items rated on a seven-point Likert scale, ranging from one (totally disagree) to seven (totally agree)). The questionnaire combined subscales from Ryan and Deci's (2000) the Intrinsic Motivation Inventory (IMI), Gulikers et al.'s (2004) 5D framework for authenticity (5DF), and Young et al.'s (2008) instrument for experiential learning (EXP). Additional items were used to collect learner's demographic information (*Age, Previous level of Education, Experience in professional work,* and *Expertise during professional work)*.

From the seven IMI dimensions, we used three subscales (in total 20 items): "*Interest/ Enjoyment*" (IMI.IE, seven items) - perception of interest and enjoyment; "*Perceived Competence*" (IMI.PC, six items) - perception of performance and acquired competences; and "*Value/usefulness*" (IMI.VU, seven items) - perception of benefits from the activity. The IMI has been used widely in studies on motivation (e.g., Jansen in de Wal et al., 2014; Klaeijsen et al., 2018). Ten items from the 5D framework were included with following dimensions: "*Course authenticity*" (5DF.CA, three items) - perception of course authenticity; "*Task Authenticity*" (5DF.TA, three items) - perception of whether the task resembled the real-world activities; and "*Physical context*" (5DF.PC, four items) - perception of whether the context of performing task was realistic. Finally, the complete questionnaire from Young et al. (2008) was used (total 12 items) to measure the quality of experiential learning. This questionnaire has four dimensions (each contains three items) that estimate learners' awareness of *Active Experimentation* (EXP.AE) and *Concrete Experience* (EXP.CE), as two steps of Re-

Contextualisation; as well as *Reflective Observation* (EXP.RO) and *Abstract Conceptualization* (EXP.AC), as two steps of De-Contextualisation.

The debriefing session

To gain deeper insights into students' activities and experiences while performing course tasks quantitative data were supplemented with qualitative data obtained from semi-structured debriefing session. The debriefing session with students contained a student reflection on the learning process stimulated by four open questions (the full list of questions for debriefing is given in Appendix A)

4.3.3 Context of study

The course we studied was designed as a hands-on introduction in educational research and instructional design for practitioners with educational background. Eight principles of the mARC model (introduced in the last paragraph of section 1.2) were lined with the course design to facilitate both processes of re- and de- contextualisation within experiential learning. The course enabled students to study literature (AE), conduct an observational study of a classroom learning situation (CE), analyze a classroom learning situation from the theoretical perspective and with the tools of an educational researcher (RO), and at the end to make generalizations from the concrete experiences through the lens of theory and methodology (AC) when writing an academic report (*seventh and eight principle of mARC*).

Furthermore, by doing practical case-study research, students should develop insights in the application of learning theories and principles at micro level (in classroom) and at meso level (curriculum design) (*first principle of mARC*). During the period of 11 weeks students are guided towards task completion through a series of learning activities (*third principle of mARC*). Students work individually or in groups, by studying material on learning theories, course and curriculum design, case design methodology, organizing, and on conducting research and reporting studies (*fourth and fifth principle of mARC*). They are encouraged to design materials to analyses data in collaboration. Oral reporting takes place in online poster presentations and group discussions, where written reporting is done individually (*sixth principle of mARC*). The course starts with a face to face introduction and continues online. Students and teachers interact through discussion boards and regular synchronous meetings in the Virtual classroom (Collaborate software). In the last week students complete the course by

submitting written academic report for assessment (*second principle of mARC*). See Appendix B. for more details on the alignment of course design and eight principles for authenticity of mARC implemented to facilitate both processes of re- and de- contextualization within experiential learning.

For this study, the course was implemented in two variants that differed in the way authenticity of the learning environment was conceptualized. Table 4.2 demonstrates the differences from the authenticity perspective (on three of five 5DF dimensions, with Assessment and Criteria being the same for both conditions).

Table 4.2. Authenticity of the learning environment as conceptualized in the present study based on framework by Gulikers et al. (2004).

Authentic Dimension	As conceptualized in the course	In less authentic condition (LA)	In more authentic condition (LA)
Task authenticity	Conducting an observational study in the educational practice at micro level (one lesson observation) and at meso level (documentation).	Observation of a video-recorded classroom situation and analysis of documents, all available online. *Level of dimension: medium.*	The students need to organize and conduct observation study in a real school context. *Level of dimension: high.*
Social context	Social processes that are equivalent to those in a professional context of a researcher included making arrangements with the teacher, principal, relevant others from a school.	Social context of a professional practice was lacking as students were provided with all materials. Therefore, the aspect of social context was missing. *Level of dimension: low.*	Students contact a school, communicate with involved teachers and school team, and execute the interview with teacher. *Level of dimension: high.*
Physical context	The physical context reflects the availability and variety of professional resources, the time constrain, as well as the complexity of professional situations presented in a research situation and online conference.	This aspect was limited, as student were offered a video recording of a learning situation and a set of accompanying documents. *Level of dimension: low.*	There was availability and variety of professional resources. It include school premises with all complexity and variety of research resources. *Level of dimension: high.*
Overall level of authenticity		**Less Authentic**	**More Authentic**

While MA students had freedom to choose a classroom learning situation to observe, who and how to conduct interviews, and which school documents to analyze, LA students were offered pre-selected observation, interview, and materials. As a consequence, the dimension of ‘task authenticity’ for tasks the learner had to carry were different. Furthermore, the dimension of 'physical context' varied between two variants of the course because of a) dissimilarity to work environment (e.g., organizing research and collection data in real practice), b) availability of resources (e.g. variety of resources, being able to choose the set of documents, or chose the set of literature), and c) differences regarding time constrains and limits (Gulikers et al., 2004). Aspects of 'social context' also differed between LA and MA, as a direct consequence of different social interactions (organizing observations, making arrangements with people in charge of affairs, and planning interviews), and a positive interdependence on the members of the school and the teacher. Also, students in MA had more opportunities to use learning results outside the learning environment (e.g. the theoretical framework is used in real classroom settings) (Strobel et al., 2012).

Constrained by the educational vision, rules of examination and ethical issues of our university, we were not in a position to make greater difference, therefore the last two dimensions of authenticity (results and criteria) were the same in LA and MA. Students are expected to demonstrate a certain level of performance as researchers by conducting a study, presenting it orally and writing it up. The authentic character of the results is reflected in the variety of professional skills students develop and multiple indicators of work (developing an instrument based on theoretical assumptions, creating a poster, giving an oral presentation during a virtual conference, and writing an academic report).

Finally, the course ‘criteria’ were used to assess the academic reports of the studies performed (with a maximum of 3000 words). Students were expected to demonstrate knowledge of learning and instructional theories, to clearly describe the observational case study, to carry out a structured and comprehensible data analysis, and to link results to theoretical principles. Teachers explained these criteria in the learning environment and the virtual class sessions. These criteria are similar for the evaluation of work in professional situations, like for journal or conference paper reviews. Academic reports must meet the requirements of scientific reporting (e.g., the overall structure to be included in an academic report), the content of the report (e.g., how students apply theory to practice, and how they extract, describe, and report

theoretically relevant meanings from a practical situation), and academic writing (e.g., the quality of argumentation and use of language).

4.4 Results

The internal consistency of each sub-scale of the questionnaire was calculated using Cronbach's α statistics (Taber, 2018). By looking in Table 4.3, four dimensions (with low numbers of items) were reliable with α values between .58 and .7, two dimensions had adequate reliability above .7 and four dimensions had high reliability above .8. As indicated in earlier works (Cho & Kim, 2015; Taber, 2018), scores that have a low number of items associated with them, as well as non-normally distributed data, tend to have lower reliability. Thus, subscales achieved sufficient internal consistency.

As much of the data were not normal non-parametric tests were run. To determine the correlation among subscales of motivation, authenticity and experiential learning in the questionnaire, Spearman rank-order correlation was run (Green & Salkind, 2008). Mann - Whitney U tests were used to investigate whether there was a statistically significant difference in the dependent variable for two groups (McElduff et al., 2010). First, we analysed whether the academic performance was same for students from LA and MA groups. Second, we tested for differences of dimensions of motivation, authenticity and experiential learning, with respect to the two groups. Later, we analysed the effects of within-subjects measures of *Age, Education, Experience, and Expertise* on the final grade and each dimension of motivation, authenticity and experiential learning.

4.4.1 Correlation analysis of questionnaire dimensions

A Spearman's rank-order correlation was run to determine the relationship between the subscales of the questionnaire. Our analysis suggest that 26 correlations between subscales of the questionnaire were statistically significant. The results of the complete correlation analysis are presented in Table 4.3. Furthermore, a test of significance indicated that there was a strong and positive correlation between overall subscale of motivation (IMI), authenticity (5DF) and experiential learning (EXP). Increases of overall motivation were correlated with increases of overall perception of authenticity $r_s(29) = .61$, $p < .01$, and overall experiential learning $r_s(29) = .73$, $p < .01$. Finally, the higher students' perceived the overall authenticity, the more they were able to engage with experiential learning $r_s(29) = .54$, $p < .01$.

Table 4.3. Cronbach's α and Spearman's rank-order correlations (n = 31).

Subscales of questionnaire	IMI.IE	IMI.PC	IMI.VU	5DF.CA	5DF.TA	5DF.PC	EXP.CE	EXP.RO	EXP.AC	EXP.AE
Interest/Enjoyment (IMI.IE)	1									
Perceived competence (IMI.PC)	ns	1								
Value/Usefulness (IMI.VU)	.75**	ns	1							
Course authenticity (5DF.CA)	ns	.37*	.41*	1						
Task Authenticity (5DF.TA)	ns	.48**	ns	.52**	1					
Physical context (5DF.PC)	.47**	ns	.37*	ns	ns	1				
Concrete experience (EXP.CE)	.55**	ns	.59**	ns	ns	.60**	1			
Reflective observation (EXP.RO)	.53**	ns	.53**	ns	ns	.67**	.69**	1		
Abstract conceptualization (EXP.AC)	.65**	ns	.79**	.40*	ns	ns	.56**	.48**	1	
Active experimentation (EXP.AE)	.63**	ns	.69**	.38*	ns	.55**	.76**	.53**	.54**	1
N (numbers of items)	7	6	7	3	3	4	3	3	3	3
Cronbach's α	.95	.84	.87	.84	.58	.63	.62	.71	.76	.62

Note: *. Correlation is significant at the 0.05 level (2-tailed); **. Correlation is significant at the 0.01 level (2-tailed); IMI = constructs correspond to the motivation subscale; 5DF = constructs correspond to the authenticity subscale; EXP = constructs correspond to the experiential learning subscale.

4.4.2 Academic performance

The Mann-Whitney U revealed no significant effect of level of authenticity on the academic performance, although we see tendency that participants in MA group scored higher than participants in the LA group on each of the evaluation criteria (Table 4.4).

Table 4.4. The learning effects on the academic performance of participants in LA and MA groups.

Evaluation criteria & Grades	Mean Ranks		Mann-Whitney		
	LA	MA	*U* score	*z*-score	*p* Value
1. Scientific reporting	16.55	19.72	124.5	-.918	.359
2. Content of the report	16.92	19.28	131.5	-.684	.494
3. Academic writing	15.16	21.38	98	-1.8	.072
Cumulative assessment	16.42	19.88	122	-.994	.320
Final Grade	16.18	20.16	117.5	-1.181	.238

Note: LA (n = 19) = Less Authentic group; MA (n = 16) = More Authentic group.

The Mann-Whitney U tests were repeated for within-subjects measures of *Age*, *Education*, *Experience* and *Expertise*. The results of the additional analysis showed that academic performance of older students was significantly higher than performance of younger students (U = 39, p = .047). It can also be concluded, that the final grades of students with more

experience were significantly higher than the final grades of the less work experienced students (U = 30, p = .031). Furthermore, there were no effects of education or expertise on the final grade (Table 4.5).

Table 4.5. Analysis of the relation between demographic characteristics and academic performance measured with Final grade.

Significance effect*	Mean Ranks		Mann-Whitney		
			***U* score**	***z*-score**	***p* Value**
Age	YO = 9.57	OL = 16.73	39	-1.99	.047
Education	HBO = 13.30	WO = 18.78	56	-1.647	.100
Experience	LE = 8.50	ME = 16.70	30	-2.158	.031
Expertise	T = 14.21	NT = 16.50	80	-.707	.479

Note: YO (n = 7) = students younger than 30 years; OL (n = 22) = students older than 30 years; HBO (n = 20) = students from universities of applied science; WO (n = 9) = students from research universities; LE (n = 6) = students with less than 5 years of working experience; ME (n = 23) = with more than 5 years; T (n = 19) = students with teaching experience; NT (n = 10) = students without teaching experience.

4.4.3 Ratings of motivation, authenticity and experiential learning

Table 4.6 illustrates the means and standard deviations of motivation, perceptions of authenticity and experiential learning between LA and MA group. The higher ranking of all subscales was on face value present in MA group (when compared to LA group). To evaluate whether these differences were statistically significant, the Mann Whitney U tests were used (Table 4.7).

Table 4.6. Means and standard deviations of each subscale of the questionnaire.

Subscales of questionnaire	Less Authentic (n = 19)		More Authentic (n = 12)	
	M	***SD***	***M***	***SD***
Interest/Enjoyment (IMI.IE)	5.32	1.05	5.74	.77
Perceived competence (IMI.PC)	4.89	.68	5.01	.68
Value/Usefulness (IMI.VU)	5.90	.78	6.07	.43
Course authenticity (5DF.CA)	5.33	1.08	5.56	.69
Task authenticity (5DF.TA)	4.68	.77	5.08	.68
Physical context (5DF.PC)	5.32	.71	6.10	.60
Concrete experience (EXP.CE)	5.65	.55	6.03	.44
Reflective observation (EXP.RO)	5.40	.94	5.94	.65
Abstract conceptualization (EXP.AC)	6.07	.62	6.17	.39
Active experimentation (EXP.AE)	5.44	.79	5.94	.40

Note: *M* = Mean (from 1 to 7); *SD* = Standard deviation; IMI = constructs correspond to the motivation subscale; 5DF = constructs correspond to the authenticity subscale; EXP = constructs of correspond to the experiential learning subscale.

The analysis of data shows no significant differences between MA and LA groups regarding motivation (and its subscales). By contrast, perception of overall authenticity was significantly higher in MA than in LA group ($U = 55$, $p = .016$). Moreover, students in MA perceived that context (5DF.PC) in which they had to perform was realistic and looked like professional practice ($U = 38.5$, $p = .002$) significantly more often than students in LA. There was no difference regarding rating of the other two subscales: the course was oriented toward future profession (5DF.CA) and the task looked similar to the task of real researcher (5DF.TA).

Table 4.7. Effects of authenticity on motivation, perceptions of authenticity and experiential learning.

Questionnaire constructs	Subscales	Mean Ranks		Mann-Whitney		
		LA	MA	*U* score	*z*-score	*p* Value
Motivation	Interest/Enjoyment (IMI.IE)	14.79	17.92	91	-.936	.349
	Perceived competence (IMI.PC)	15.37	17.00	102	-.490	.624
	Value/Usefulness (IMI.VU)	16.00	16.00	114	0	1
	Motivation overall	14.87	17.79	92.5	-.874	.382
Authenticity	Course authenticity (5DF.CA)	15.47	16.83	104	-.416	.677
	Task authenticity (5DF.TA)	14.16	18.92	79	-1.443	.149
	Physical context (5DF.PC)	12.03	22.29	38.5	-3.083	.002
	Authenticity overall	12.89	20.92	55	-2.401	.016
Experiential learning	Active experimentation (EXP.AE)	13.50	19.96	68.5	-1.878	.060
	Concrete experience (EXP.CE)	13.82	19.46	66.5	-2.081	.037
	Re-Contextualization	13.26	20.33	62	-2.13	.033
	Reflective observation (EXP.RO)	15.74	16.42	72.5	-1.729	.084
	Abstract conceptualization (EXP.AC)	13.61	19.79	109	-.209	.835
	De-contextualization	14.32	18.67	82	-1.313	.189
	Experiential learning overall	13.74	19.58	71	-1.747	.081

Note: LA ($n = 19$) = Less Authentic group; MA ($n = 12$) = More Authentic group.

Regarding overall perception of experiential learning, the Mann-Whitney U test demonstrated a tendency for students to perceive their learning environment as more experiential ($U = 71$, $p = .081$) if the environment encompasses more authenticity. Next, it can be concluded that more authenticity in the learning environment influenced students to rate the re-contextualisation process significantly higher than students in the less authentic environment ($U = 62$, $p = .033$). More authenticity in the learning environments had a significant effect on the perception that 1) new learning experiences or professional situations were encountered (Concrete experience, $U = 66.5$, $p = .037$) and that 2) experimenting with course concept and theories was done in order to improve understanding (Active experimentation, $U = 68.5$, $p = .06$).

On the contrary, there was no statistical effect of different levels of authenticity found on the de-contextualisation process of experiential learning. Although, this can be the consequence of the "ceiling effect", as both LA and MA students scored very high. That becomes evident from Table 4.6, where Means (Standard deviation) regarding the sub-construct of Abstract conceptualization (AC) were 6.07 (.62) for LA, and 6.17 (.39) for MA students.

Finally, The Mann-Whitney U test was repeated for within-subjects measures of *Age*, *Performance, Education*, *Experience* and *Expertise* for each of the dependent variable (Motivation, Authenticity, and Experiential learning). These variables had no significant effect on the perception of authenticity and experiential learning. The only significant statistical difference was in favour of participants coming from the research universities, when compared to students coming from universities of applied sciences, regarding the perception of the value and usefulness of learning activities ($U = 51.5$, $p = .038$).

4.4.4 Analysis of the debriefing sessions

Examples of the students' responses during the debriefing session are included to provide more clarity on the overall perception of the learning processes and the awareness of re- and de-contextualisation processes. Students in both groups agreed on the relevance of authenticity, and clearly value the contextualisation of learning in a context that mirrors professional work. Moreover, no negative observations were noted.

> *The assignment was instructive and especially interesting because you get a feel for the theory, learn to recognize the concepts in a real situation and also learn to write an academic report. All concepts are present and you are given many tools to work with the (many) theory and to organize it in such a way that it becomes logical* (Student 13, LA).

> *The task was interesting in terms of content. Furthermore, the performance in a realistic setting was instructive* (Student 25, MA).

As described earlier, the learning task included a variety of assignments and activities in a context of professional practice. The most students, in both groups, claimed that they had opportunity to make a connection between knowledge and practical experience:

> *It is interesting to link theory to practice and practice to scientific writing. I still find this very difficult, so a good learning process* (Student 8, LA).

> *I could combine the theory and my practical experience to carry out the assignment* (Student 26, LA).
>
> *Although I have a lot of observation experience; yet from a larger learning-theoretical framework it was a new experience. It helps to try to connect practice and theory* (Student 9, MA).

However, when students describe their awareness of ties between theory and practice, the process of re-contextualization seems to occurs more often than pointing out processes of de-contextualization. This aspect of placing theory into practice becomes more evident when analysing students debriefing:

> *The assignment was fun and instructive to do. It gave a picture of what an educationalist does to put the theory into practice* (Student 17, LA).
>
> *It gives concepts depth and places them more in concrete reality* (Student 25, MA).
>
> *Once the learning theory framework was constructed, I could easily recognize it and link it to the instructions* (Student 4, MA).

4.5 Discussion and Conclusion

Following the extensive literature of Brown et al. (1989), Herrington et al. (2000, 2007), Gulikers et al. (2004, 2008) and many others, students should be given the opportunity to apply knowledge in the context of the (future) work environment using professional skills and tools. Yet, the impact of such learning environments on experiential learning within academic master's program remains largely unexplored. This study was set up to provide empirical evidence on how authenticity can be used to support motivation, academic performance and facilitate both re- and de-contextualisation of knowledge. Findings (both qualitative and quantitative) yield a number of important points for discussion.

Regarding the first research question, it should be noted the difference between the grades were not statistically significant. Our additional analysis shows that students in a more authentic environment perceived higher overall authenticity then students in a less authentic environment. This is in line with Strobel et al. (2012) who suggested that mirroring professional context and output are important features of the perception of authenticity. Although the variance between the two learning environments in our study was only manifested in three of the five dimensions of the Gulikers et al.'s (2004) framework, it seems that this was sufficient

enough for students to perceive the difference in overall authenticity. This may be because the task and context dimensions of authenticity are the most obvious to observe (Strobel et al., 2012). Roach et al. (2018) suggested that these two dimensions together provide enough cognitive realism to ensure students' authentic learning. Additionally, our study varied the social dimension of authenticity as students had an opportunity to contact a school, communicate with involved teachers and school team, collect material, and execute the interview with teacher. Therefore, students in MA 1) interacted with a professional community of practice, and 2) used learning outcomes outside the learning environment (e.g., the theoretical framework students create is used during real classroom observation). Strobel et al. (2012) considered the latter as a critical factor of authenticity that motivates students to pursue a certain activity (Impact Authenticity).

Furthermore, we found that different students' demographics (such as performance, age, education, work experience, and professional expertise) did not influence the students' perception of authenticity. These results indicate that two levels of authenticity were designed in such way to be independent of students' demographics. This resulted to some degree in answering the long standing issue about how to effectively persuade learners in higher education programs that they are learning in an authentic environment (Herrington et al., 2000; 2007). It can be concluded that aligning the learning task with the professional proximity can be successfully done based on Gulikers et al.'s (2004). In addition, we propose educators to design authentic tasks according to all five dimensions of authenticity, and most importantly, to incorporate a higher level of authenticity in each of the dimensions.

With regard to the second research question, the results of the correlation analysis indicate a positive relationship between the dimensions of motivation (perceived interest and value), perception of authenticity and experiential learning. Moreover, the overall perceptions of motivation, authenticity and experiential learning were dependent on each other, interlinked rather than discrete and disconnected. These results are in line with Herrington and Oliver (2000) and Hramiak et al. (2009) who earlier concluded that authentic learning tasks help students to develop professional skills and to stay motivated for the learning process.

Regarding the third research question, whether students were able to engage in the steps of Kolb's cycle, the research results are in favour of more authenticity. These results indicate that designing the authentic learning task to facilitate experiential learning (and both processes of re-contextualisation and de-contextualisation), can be successfully done following the eight

principles of the mARC model (Radović et al., 2021c, 2021f), as introduced in the theoretical section of this article. Students in MA scored significantly higher than students in LA on the Re-Contextualisation sub-construct, indicating that more authenticity 1) gave them more practical experience to help construct theoretical concepts and 2) involved them in testing ideas and experimenting with the course concepts. No difference, was found on the De-Contextualisation sub-construct. Two possible explanations exists for these findings. First, the Abstract conceptualization step (EXP.AC) was rated equally and very high across two groups (see Table 4.6). Second, insights from the debriefing sessions indicated that students do not clearly generalise from these practical learning experiences. Our data suggest that students' awareness of the re-contextualization process seems to occur more often than awareness of processes of de-contextualization. This could well be a specific characterization of this specific group of participants, who are already working as professionals and have mainly experienced re-contextualisation practice in their previous education (within teacher education institutes where students practice theory, rather than theorise on practice). Following discussion will provide recommendations for future studies on this subject.

Finally, in the light of the fourth research question, we investigated the effects of different demographic factors. Our analysis has shown that the older participants performed better than the younger students. Moreover, students with more work experience performed significantly better than students with less work experience. One of the possible explanations for this, as Darling -Hammond and Snyder (2000) mention, is that students with more working experience are often more capable to relate authentic learning experience in such a way that new knowledge is created.

Two limitations of this study should be taken into account. First, constrained by the educational vision, rules of examination and ethical issues of our university, we were not in a position to make even greater difference between two authentic environments. Also, we were not able to compare these two authentic conditions with other environments, which followed a more traditional approach to university education (let's say not-authentic). While various problems could occur (other than the non-comparable characteristics of content, different student populations, roles of teachers during learning, et cetera), we still believe that the results of such a comparison could be interesting. Second, our study presented results from a rather small sample of only 37 participants. Some of the results were on the edge of statistical significance, and it is possible that if more participants would have been involved, these results would have

reached significance. Finally, a methodological issue regarding sampling should also be addressed. Students were free to choose a learning condition. They were aware of the "video option" as a contrast to the "live observation". For this study we were not able to investigate whether this bias the outcomes of the research.

Our discussion raised two interesting recommendations for future studies needed to be examined in particular. First, it must be emphasised that authentic environments in this study encompassed reflection learning processes, although this was not a dominant learning strategy used. According to Elvira et al. (2017) and others, reflection should be an important aspect of the learning process for students to develop higher-order thinking skills, and an ability to generalize from learning experience and rationalize decisions made in regard to the developed understanding and previous beliefs. Boud et al. (1985, p. 19) wrote that reflection does not happen alone, rather learners must be supported to "explore their experiences in order to lead to new understanding". Moreover, the lack of critical reflection on the relevant learning experiences can hinder the process of developing understanding and generalisation form practical experience. Following these conclusions and according to our results, future research should investigate to what extent critical reflection activities can be included to further support students generalisation and abstracting; rather than just having a perception of engaging into process of de-contextualisation.

Second, this study assert that older students, as well as students with extensive work experience, outperformed younger and less experienced students. More insights in the characteristics and mechanisms that provoke these outcomes can help design more effective learning environments. Perhaps designing more knowledge sharing activities (between more and less experienced students) could help students to engage with new ideas and different perspectives. A similar conclusion is indicated by a recent study by Clara et al. (2019), in which they explain that sharing reflective thinking between peers in a collaborative setting could promote more critical thinking. This leads to a final recommendation for future studies to investigate to what extent collaborative activities can be used to share expertise and professional knowledge when re- and de-contextualising in an authentic learning environments.

Chapter 5

Strengthening the relation between theory and practice through prompted reflection

This chapter presents a study where students were stimulated to reflect during experiential learning, in order to both re- and de- contextualise their knowledge. The study describes how different levels of prompted reflection can be related to academic performance and perceptions of the learning process. The results demonstrate positive relationships between prompting reflection and the academic performance. It is furthermore argued that prompting reflection leads to higher levels of reflection and better performance in writing. The results also show that higher levels of reflection do not have to diminish students' motivation, perception of usefulness, interest and enjoyment during learning.

This chapter is based on: Radović, S., Firssova, O., Hummel, H. G. K., & Vermeulen, M. (2021). Improving academic performance: strengthening the relation between theory and practice through prompted reflection. *Active learning in Higher Education*, 1–15, DOI: 10.1177/14697874211014411.

5.1 Introduction

Reflection is essential for learning and knowledge growth. Reflection can be defined as "the active, persistent and careful consideration of any belief or supposed form of knowledge in the light of the grounds that support it and the further conclusion to which it tends" (Dewey, 1933, p. 9). Its importance is generally accepted, both in formal education (Buschor & Kamm, 2015; Ryan, 2011) and in professional development programmes (Orland-Barak & Yinon, 2007; Schön, 1983). Reflection is considered as key component of learning enviorments that need to bridge academic and practical experiences (Buschor & Kamm, 2015; Coulson & Harvey, 2013; Orland-Barak & Yinon, 2007). The theory of experiential learning, developed by Kolb (1984; 2015), suggests that reflection is part of the cyclic learning process of 1) applying theoretical knowledge in practical situations (re-contextualization, steps of Concrete Experience and Active Experimentation), and 2) creating new understanding from practical experiences by generalization (de-contextualization, steps of Reflective Observation and Abstract Conceptualization) (Boud et al., 1985; Kolb, 1984; Tynjälä et al., 2003).

When students reflect on relationships between formal academic knowledge and concrete learning experiences, a deeper understanding develops (Ghanizadeh, 2017). Studies have shown that experiential learning environments that provide opportunities for reflection enhance students' academic success and performance (Dyment & O'Connell, 2011; Peltier et al., 2005) and increase examination scores (Hamilton & Mallett, 2018). For example, Mountford and Rogers (1996) showed positive influence on students' educational outcomes via several factors: academic self-concept, task awareness, views of knowledge, the influence of knowledge on behaviour, writing skills, and generating knowledge by reflecting and discussing. However, reflection not only challenges learning experience and knowledge, but has influence beyond cognition (Cavilla, 2017). It also makes learners identify personal assumptions, questions their philosophies (Gibbs, 1998; Ursin & Paloniemi, 2019), and develops awareness of the reasons behind their perceptions, emotions, and actions (Kember et al., 2000). Others argued there are benefits of reflection such as enhanced satisfaction and motivation to complete academic tasks (Cavilla, 2017; Dyment & O'Connell, 2011). The latter benefit specifically relates to 'intrinsic' motivation and commitment of students to learn and grow (Cavilla, 2017; Ryan, 2013).

Despite the generally acknowledged relevance of learning, many factors influence the enjoyable and efficient practice of reflection. In addition to the general lack of practice-oriented research into reflection, there is also an imbalance between the number of articles exploring

processes of re-contextualisation and de-contextualisation (Liu, 2017; Peltier et al., 2005; Radovic et al., 2021e). While both processes are important, it seems that researching de-contextualization is neglected when compared to studies exploring re-contextualisation (Orland-Barak & Yinon, 2007). The literature often mentions negative feelings of students (Perry & Martin, 2016) who state that reflection is "a pointless ritual wrapped in meaningless words" (Shor, 1992, p. 83). Others acknowledge that curricular activities and educational practice fail to systematically support reflective thinking, which over time tends to become superficial (Ryan & Ryan, 2013). Finally, students lack reflective thinking skills (Peltier et al., 2005), are unfamiliar with reflective practice, and are not guided how to reflect (Ryan, 2013).

5.2 Strategies to support reflection

Although reflection is a complex cognitive and emotional process (Liu, 2017; Ryan & Ryan, 2013), development of reflective skills can be effectively supported (Mirriahi et al., 2018). Three complementary strategies to facilitate knowledge development and learning benefits from reflection in experiential learning environments can be distilled: written reflection, prompting and guiding questions, and coherent instructional elements.

5.2.1 Written reflection.

Educators often refer to writing exercises as a strategy to support learning (Dyment & O'Connell, 2011; Ryan, 2013; Ryan & Ryan, 2013). Such practice can take many forms, ranging from offline notes to online blogs and journal entries (Mirriahi et al., 2018). Although the methods may be different, they all support students in structuring their thinking and making their understanding explicit through permanent recording of thoughts (Hamilton & Mallett, 2018). For instance, Dyment and O'Connell (2011, p. 82) suggested that writing reflective journals can help students to “move beyond the basic ability to recall facts and knowledge, and move toward connecting learning”. There are benefits of sharing reflective journal writings. Socially shared reflection writing is recognized as a mechanism to promote more critical thinking between peers (Rantatalo & Karp, 2016; Splichal et al., 2018). In such a way students are involved with new ideas and other perspectives they can employ in developing their own knowledge (Clara et al., 2019; Hamilton & Mallett, 2018).

5.2.2 Prompts and guiding questions for reflection.

Reflection does not happen spontaneously. It requires learners being directed towards examining their beliefs and understanding for developing new knowledge (Boud et al., 1985). To benefit from reflection, there is the importance of focusing reflection towards a certain learning goal, rather than letting learners examine (sometimes irrelevant) events, ideas, or learning issues (Ryan, 2013; Trede & Jackson, 2019). The focus of reflection can be directly activated by using reflection prompts and guiding questions (Coulson & Harvey, 2013; Dyment & O'Connell, 2011). If these prompts fit the curriculum (Mirriahi et al., 2018) they can support students in confronting the potential pitfalls of experiences, learning dilemmas, and new theories that they meet in every course. Students are thus encouraged to see the complexity of knowledge (Elvira et al., 2017).

5.2.3 Instructional elements for reflection.

The availability of strategies such as written reflection and reflection prompts in a learning environment does not automatically lead to effective and efficient use (Mirriahi et al., 2018). A more integrated instructional approach for designing learning environments is needed for incorporating reflection during experiential learning (Ash & Clayton, 2004; Borton, 1970; Ryan, 2013). A set of instructional elements for mARC (more Authentic, Reflective and Collaborative learning) are used to foster processes of re-contextualization and de-contextualization in experiential learning (Radović et al., 2021f). This mARC model suggests that a learning environment should 1) *encompass reflection tasks as an essential step* to support learners in the transition from a concrete to an abstract view; 2) consider reflection as an additional *tool to help learners* carry out complex tasks; 3) include reflection to address both processes of *re- and de-contextualisation* (each when possible in accordance with the learning goals); 4) help learners *move through the experiential learning cycle;* 5) present reflection *seamlessly integrated* into the learning environment; and 6) *support learners'* self-development by advancing their meta-cognitive skills and personal growth.

The quality and level of student reflection during experiential learning can vary (Ghanizadeh, 2017; Kember et al., 2008; Ryan, 2013). Kember et al. (2008), following the work of Boud et al. (1985) and Mezirow (1981), suggested there are four hierarchical levels of reflection. These levels are placed on a continuum going from descriptive levels, without significant thinking about the topic (habitual actions, first level), going through 'understanding' (second level)

towards more critical reflection levels (intensive reasoning actions), when existing understanding and fundamental beliefs are challenged as a result of conceptual conflicts (see Table 5.1).

Table 5.1. Levels of reflection, based on Kember et al. (2008).

Levels of reflection	**Description**
Habitual actions	Habitual actions are the lowest levels of reflection (Bell et al., 2011; Peltier et al., 2005). They usually occur when students deal with a topic without significant thinking about it, or when they provide answers without trying to understand the theory that underpins the question (Kember et al., 2008). Habitual actions are characterised by minimal learner effort (simple memorisation and surface learning). Novice learners behave in this manner when describing practical events without trying to understand their causes and consequences.
Understanding	Together with habitual actions, understanding is also acknowledged as a lower level of reflection. It takes place when students move away from surface learning and attempt to show understanding of theory (Kember et al., 2008). However, most of what is experienced is processed within pre-existing schemas, rather than by challenging current understandings (Peltier et al., 2005). Therefore, concepts and meanings from different sources are combined to provide a general overview of the topic, without attempting to provide a more personal meaning or justification for events (Kember et al., 2008). Students will not relate theoretical knowledge to the practical application, nor will they explicate the potential relevance of theory.
Reflection	The next two levels of reflection are both associated with more in-depth thinking and thoughtful learning. They are recognised as higher levels of reflection (Peltier et al., 2005; Kember et al., 2008; Mezirow, 1981). This level involves the critiques of the assumptions and searches for meaning by questioning personal experience. It takes place when students attempt to present insights that go beyond literature and attempt to apply theory to practical situations (Kember et al., 2008). Reflection in writing is evident when students discuss their experiences acquired in practical situations in relation to theory (Peltier et al., 2005; Kember et al., 2008).
Critical reflection	Critical reflection is the highest level of reflection. Critical reflection occurs when existing conceptual models and fundamental beliefs are challenged as a result of learning (new information, different experiences or contrary views). Mezirow (1981) argues that this level of reflection includes becoming aware of personal assumptions and leading to a critical review of one's own conceptual perspectives. Critical reflection is a difficult task and as such not common to be evidenced in students' work (Kember et al., 2008).

It is believed that of the levels of 'reflection' (third level) and 'critical reflection' (fourth level) have the greatest impact on academic performance and student motivation (Ghanizadeh, 2017; Kember et al., 2008). These higher levels are characterised by a changing conceptual perspective, awareness of the reasons behind actions, and critical evaluation of

assumptions. On the other end of the continuum, habitual action is not related to any conscious thought or deep cognitive processing (Ghanizadeh, 2017). Such a surface approach to learning is also characterised by little or no intent to get to the underlying meaning of what is learned, and is typically related to lower learning outcomes (Ellis & Bliuc, 2019).

5.3 Research questions for this study

Ryan and Ryan (2013) propose ways to promote students' reflection and that the focus of reflection should be determined by course content, personal dilemmas, and learners' beliefs. There are also ways to determine the level of students' reflection (Kember et al., 2008; Ghanizadeh, 2017). However, there is scarce literature documenting relationships between levels of reflection and learners' perceptions of their learning process and academic performance. Hence, having in mind that reflection is a complex cognitive and emotional process, it seems essential to explore the overall relationships between different levels of prompted reflection, academic performance, motivation during learning process, and perceptions of experiential learning. Therefore, the following research questions were investigated:

RQ 1. How do different levels of prompts affect the level of reflection in students' reflective writing?

RQ 2. How do different levels of prompted reflection affect their academic performance?

RQ 3. How do different levels of prompted reflection affect motivation during their learning process (enjoyment, perceived competences and usefulness) and perception of experiential learning?

RQ 4. How do various demographic characteristics relate to students' academic performance and learning perceptions?

5.4 Method

Three variants of a learning environment were designed according to the reflection levels of Kember et al. (2008). The variants differ in the extent of prompted reflection: 1) Without reflection prompts, 2) prompting for understanding level (including levels 'habitual actions' and 'understanding'), and 3) prompting reflection levels (including levels 'reflection' and

'critical reflection'). This study was situated in the first course of a Master of Educational Sciences at the Open University of the Netherlands. This program is offered through distance learning and was designed for professionals in education, mainly teachers who seek an academic degree and combine work and study to attain this goal. To evaluate the effectiveness of different levels of reflection in relation to the research question mixed methods research design with multiple data sources were used: final academic report assessments (as measure of students' academic performance defined by the course outcomes); students' reflective contributions to the discussion forum (as a measure of the quality of reflection during learning); and a post-test questionnaire (with measures on different aspects of motivation and perception of experiential learning). The research was approved by the Ethics Review Committee of the Open University of the Netherlands.

5.4.1 Context

The course teaches students to apply theoretical knowledge. They analyze instruction during a classroom observation at school (case study) from the perspective of main learning theories (behaviorism, cognitivism, constructivism). They also study information by interviewing a school teacher and studying school policy documents. Based on the observation, interview and desk study they further decontextualize knowledge and describe the actual implementation of these learning theories in instructional practice (as compared to the policy) by writing a report. During a period of 11 weeks, students are guided towards task completion through a series of learning tasks (see Table 5.2). The course starts with a face-to-face introduction and then continues online. Students and teachers interact through discussion boards and regular synchronous meetings in an online learning environment. Students work individually or in groups, by studying material on learning theories, course and curriculum design, case design methodology, and on conducting research and reporting studies. Oral reporting of conducted case studies takes place in online poster presentations and group discussions, where written reporting is done individually. In the last week students complete the course by submitting written reports which are assessed. By doing case-study research students develop insights in the application of learning theories and further de-contextualize knowledge.

Table 5.2. Course Timetable.

Study tasks	Course Timetable (in weeks)										
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**
Study task 1: Activating prior theoretical knowledge	x	x									
Reflection task 1		x									
Study task 2: Preparation for an observation study		x									
Reflection task 2			x								
Study task 3: Designing a theoretical framework for the observation			x	x							
Reflection task 3				x							
Study task 4: Conducting observation and process data					x	x	x				
Reflection task 4						x	x				
Study task 5: Presenting results in online poster presentation						x	x	x	x		
Reflection task 5								x	x		
Study task 6: Finalizing data analysis and writing up the study							x	x	x	x	x

5.4.2 Participants

Participants were students of two cohorts (February 2019 and September 2019) who completed the course and gave written consent to participate in the study (n = 84).

Table 5.3. Students' demographic information.

Category	BL (n = 31)		UN (n = 19)		RE (n = 17)		Tot (n = 67)	
	N	**%**	***N***	**%**	***n***	**%**	***n***	**%**
Gender								
Male	4	13%	3	16%	2	12%	9	13%
Female	27	87%	16	84%	15	88%	58	87%
Previous level of Education								
Professional bachelor/master	22	71%	10	53%	11	65%	43	64%
University bachelor/master	9	29%	9	47%	6	35%	24	36%
Work experience								
0-5 years	7	23%	2	11%	1	6%	10	15%
5-10 years	6	19%	6	32%	3	18%	15	22%
>10 years	18	58%	11	58%	13	76%	42	63%
Expertise during professional work								
Teaching profession	20	65%	9	47%	7	41%	36	54%
Age	***M***	***SD***	***M***	***SD***	***M***	***SD***	***M***	***SD***
In years	37.3	9.19	36.84	9.03	38.35	6.97	37.43	8.65

Note: BL = Base line group; UN = Prompting understanding group; RE = Prompting reflection group; *M* = Mean; *SD* = Standard deviation. Seventeen students did not fill in the questionnaire: six from the baseline group, who had no specific prompts, five from the prompting understanding group and six from the prompting reflection group, so questionnaire data could be collected from 67 participants.

Students enrolled in the February 2019 cohort were used as control group, further specified as the baseline group, that is, without receiving any reflection prompts (n = 37). Students enrolled in September 2019 cohort were randomly divided into the two experimental groups. One was the prompting 'understanding' group (n = 24) and the other was the prompting 'critical reflection' group (n = 23). Each group was allocated to the corresponding online learning environment. Table 5.3 provides a picture of their demographics (Kruskal-Wallis test showed no significant difference between three groups in respect to the demographic variables).

5.4.3 Treatment

Experimental conditions were three course variants. In the control condition (baseline group) students were not stimulated to reflect on the tasks in any way, and in the two experimental conditions (the prompting 'understanding' group and the prompting 'critical reflection' group) they were required to reflect with provided prompts (Table 5.2). According to Kember's et al. (2008) framework introduced in Table 5.1, students in the prompting understanding group were prompted toward providing evidence on understanding concepts and theory, or describing issues arising from concrete experience (*habitual actions* and *understanding*); Students in the prompting critical reflection group were prompted to use practical context to think about theory (and vice versa) and to consider personal beliefs to have direct influence on learning activity (*reflection* and *critical reflection*). Reflection prompts in our intervention helped students to 1) re-capitulate the relevant learning theme, 2) write an answer (of up to 300 words) to the respective reflection prompt, and 3) share their writing with their peers using the discussion forum. These assignments were aligned to integrate reflection with experiential learning and address processes of re- and de-contextualisation. Table 5.4 introduces the objectives of all reflection prompts and further describes their alignment with the course curriculum.

Table 5.4. Summary of reflection prompts.

Task	Group	Description of the difference between reflection tasks in two experimental conditions and their relation to the course
Reflection task 1	UN	To complete study task 1, students are asked to elaborate their understanding of theory and to provide an overview of the questions from Dillon's curriculum theory and Valcke's basic concepts and educational frame of references. Reflection task 1 is related to the core course readings.
	RE	In addition to the clarifying understanding of theory (in the UN condition), students in RE were further prompted to discuss theoretical knowledge in relation to practical situations. Students are asked to re-contextualize their

Task	Group	Description of the difference between reflection tasks in two experimental conditions and their relation to the course
		knowledge in order to illustrate the basic theoretical concepts through their own educational context and practical experiences.
Reflection task 2	UN	Study task 2 is about framing research design for an observation study (which will take place in Study task 4). Within Reflection task 2 students are asked to elaborate their preparation for the research (type of research, research method, research techniques, and how this method contributes to research question). This was planned as a tool to help students carry out complex tasks and carry out assignments they are not familiar with.
	RE	Students in RE were further prompted to reflect-for-action, to think about the event that follows in terms of the pitfalls of conducting research in educational practice. This was a reflection exercise to support students in challenging personal beliefs and assumptions in anticipating possible problems in carrying out the observation.
Reflection task 3	UN	In Study task 3 students used knowledge of learning theories to develop an analytical instrument. This instrument will be used later in the course to systematically analyse the observation and to write the final essay. Within Reflection task 3 students were prompted to explain what they are going to include in the theoretical framework from different perspectives on learning.
	RE	In addition to providing understanding into the theory as in UN condition, students in RE were further prompted to choose three concepts from the analytical instrument and to find concrete arguments citing their own practical experiences and educational examples. In this way students are asked to decontextualize their understanding from practical context as a way to strengthen their knowledge.
Reflection task 4	UN	In Study task 4 students carried out the observation of a classroom situation and collected data that they will process to answer the research question. Reflection task 4 prompts students to search for a meaning of the observation and to prepare for the writing of the final essay.
	RE	Students in RE were additionally prompted to reflect on the observation process itself. They were asked to discuss experiences acquired from practical situations in relation to fundamental beliefs and personal philosophies they had prior to observation. “Suppose you could go back in time and have to tackle the task again. What else would you have done and why?”
Reflection task 5	UN	Study task 5 was about preparing results of the observation and the development of a concise poster for the virtual conference presentation. This is also a preparation for writing a final essay. Reflection task 5 is planned after the online presentation to encourage students to think about new insights and conclusions that the presentations and the subsequent discussion yielded?
	RE	Students in RE were additionally prompted to become aware of personal assumptions and understanding in the light of new information, different experience or contrary view that were presented. Moreover, students were asked if there are conclusions that may now have become clearer or if their knowledge can be improved on the basis of everything they had heard and discussed.

Note: UN = Prompting understanding condition; RE = Prompting reflection condition.

5.4.4 Measures

Levels of reflection. Kember et al.'s (2008) level categories as introduced in Table 5.1 were used to measure the level of reflection in writing. The levels 'habitual actions' and 'understanding' both represent the level of 'understanding', while the levels 'reflection' and 'critical reflection' both represent the level of 'reflection' (Bell et al., 2011; Kember et al., 2008). All written answers were analysed on the evidence of reflection, and categorised according to the highest reflection level observed.

We collected 215 written answers on reflection tasks from the discussion forum (contributions with an average of 300 words to each learning task). Each contribution was first translated from Dutch to English, and rated by one member of the research team. To assure the validity of the coding process, 83 (38% of total amount) contributions were evaluated by another member of the research team, initially yielding a $K = .593$. Discussions between the raters have led to some improvements of the coding schemes and re-evaluation process. Finally, the Cohen Kappa test indicated 'outstanding' agreement (according to Landis & Koch, 1977) between the two raters' judgments, with $K = .900$ and $p < .0001$. Students were responsive in completing their reflection tasks in both experimental groups (85% response in the prompting understanding group and 98% response in the prompting reflection group). To evaluate the relation between different experimental conditions and the levels of reflection in students' contributions, Mann-Whitney *U* tests were conducted.

Academic performance. The effects on students' academic performance were measured through the final grades for their report. The assessment framework used for this grading contains three groups of criteria. First, the reports have to meet the general criteria of scientific reporting, such as the quality of the introduction, theoretical framework, methods, results, conclusion and discussion sections (seven criteria). Second, the report is scored/marked on the quality of its content, on how well students describe an instance of practice, demonstrate their theoretical knowledge and apply it by analysing this practice through a theoretical lens (four criteria). Third, the requirements of academic writing, such as the quality of argumentation, structure, references and language use have to be met (four criteria). Taken together these criteria form the final grade.

The questionnaire. This contained 32 items to be scored on a seven-point Likert scale, with values ranging from one ("totally disagree") to seven ("totally agree"). It combined subscales

from Ryan and Deci's (2000) Intrinsic Motivation Inventory and Young et al.'s (2008) instrument for experiential learning. The Intrinsic Motivation Inventory has been used many times and validated in different contexts (e.g., Jansen in de Wal et al., 2014; Klaeijsen et al., 2018).

From the seven Intrinsic Motivation Inventory dimensions, three subscales were used (a total of twenty items): "*interest/enjoyment*" - perception of interest and enjoyment; "*perceived competence*" - perception of performance and acquired competences; and "*value/usefulness*" - perception of benefits from the activity. The complete questionnaire from Young et al. (2008) was used (a total of twelve items) to measure the quality of experiential learning. This questionnaire had four dimensions (each containing three items) that estimate learners' awareness of *active experimentation* and *concrete experience*, as two steps of re-contextualisation; as well as *reflective observation* and *abstract conceptualization*, as two steps of de-contextualisation. Additional items were used to collect learner's demographic information (*age, previous level of education, experience in professional work,* and *expertise during professional work)*.

The internal consistency of each sub-scale of the questionnaire was calculated using the Cronbach's α statistic. As has been explained (e.g. Taber, 2018), sub-scales that have a low number of items, as well as non-normally distributed data, tend to have a lower reliability. One dimension (with three items) was reliable with α = .62, two dimensions had good reliability above .7 and four dimensions had high reliability scores above .8 (see Table 5.5). Overall, Cronbach's α statistic indicated that subscales achieved adequate internal consistency.

Table 5.5. Cronbach's α and Spearman's rank-order correlations (n = 67).

Questionnaire subscales		**N**	***α***	**IMI.IE**	**IMI.PC**	**IMI.VU**	**EXP.CE**	**EXP.RO**	**EXP.AC**	**EXP.AE**
Motivation	Interest/Enjoyment	7	.92	1						
	Perceived competence	6	.82	.37**	1					
	Value/Usefulness	7	.90	.73**	.30*	1				
Experiential learning	Concrete experience	3	.62	.65**	.32**	.70**	1			
	Reflective observation	3	.71	.59**	.30*	.67**	.69**	1		
	Abstract conceptualization	3	.80	.66**	.39**	.79**	.62**	.60**	1	
	Active experimentation	3	.77	.63**	.30*	.75**	.69**	.65**	.66**	1

Note: * = Correlation is significant at the 0.05 level (2-tailed); ** = Correlation is significant at the 0.01 level (2-tailed); N = Number of items; α = Cronbach's α.

5.4.5 Analyses

As much of the data was not normally distributed, non-parametric tests were run. To determine the correlation among subscales of motivation and experiential learning in the questionnaire, Spearman rank-order correlation was run (Green & Salkind, 2008). Analysis showed high and consistent correlations between all subscales (with 19 out of 21 subscales being significant at the 0.01 level). Moreover, a two-tailed test of significance indicated that there was a strong and positive correlation between overall perception of motivation and overall quality of experiential learning (r_s = .79, p < .01). Next, Kruskal-Wallis H tests were used to investigate effects of reflection level on perceptions of motivation and experiential learning, where Mann-Whitney U tests were applied to control for effects of student characteristics. The Mann-Whitney U test was applied to analyse the relation between reflection level of prompts and the reflection levels in students' contributions. Finally, Kruskal-Wallis H tests examined the effects of reflection levels on academic performance. The significant results, adjusted by the Bonferroni correction for multiple tests, were further examined through post hoc tests and pairwise comparisons between groups.

5.5 Results

5.5.1 Quality of reflection in students' contributions

The number and percentage of students' contributions at different levels of reflection are presented in Table 5.6. The results show that students from the prompting reflection group (Mean Ranks = 35.61) reached significant higher levels of reflection more often (U = 9, p < .001) than students from the prompting understanding group (Mean Ranks = 12.88). Note that only 42% of students' contributions from the prompting understanding group reached the reflection level, compared to 74% in the prompting reflection group. The results show that when students are prompted at the reflection (and critical reflection) level during learning, they are enabled to reach a higher level of ability in their reflective writing.

Table 5.6. Number and percentage of students' reflection contributions from discussion forum achieving different levels of reflection.

Experimental condition	Reflection in contributions	Reflection task (RT)					Total
		RT1	RT2	RT3	RT4	RT5	
UN (*n* = 24)	Understanding	12 (63%)	22 (100%)	18 (86%)	6 (30%)	1(5%)	59 (58%)
	Reflection	7 (37%)	0	3 (14%)	14 (70%)	19 (95%)	43 (42%)
	N	19	22	21	20	20	102
RE (*n* = 23)	Understanding	9 (39%)	10 (43%)	7 (30%)	2 (9%)	1 (5%)	29 (26%)
	Reflection	14 (61%)	13 (57%)	16 (70%)	20 (91%)	21 (95%)	84 (74%)
	N	23	23	23	22	22	113

Note: UN = Prompting understanding group; RE = Prompting reflection group; N = total number of contributions.

5.5.2 Academic performance

The effects of prompting level on academic performance are provided in Table 5.7. Significant differences among groups were evident in respect to *final grade* (H = 6.28, p = .043) as measure of academic performance. The three groups also differed significantly on the *content of the article* criteria (H = 6.903, p = .032) for the report. Marginally significant differences between groups were observed for *scientific reporting* (H = 4.804, p = .091). No significant differences between three groups were observed for *academic writing* criteria. Students in the prompting reflection group outperformed students in the baseline group (no prompts) on their *final grade* (p = .039). On the *content of the article,* we found a marginal significant statistical difference in favour of students from the prompting reflection group when compared to the prompting understanding group (p = .08). This indicates that, when prompted for reflection (and critical reflection), students not only demonstrate higher levels of reflection but also demonstrate a better understanding of their theoretical knowledge and ability to apply it. We may therefore conclude that guidance for (critical) reflection indeed enhances the quality of scientific reporting.

Table 5.7. The learning effects of various levels of reflection on the academic performance.

Evaluation criteria and grades	Mean Ranks			Kruskal-Wallis		
	BL	UN	RE	x^2	*df.*	*p*
1. Scientific reporting	33.76	43.87	46.17	4.804	2	.091
2. Content of the article	33.34	41.26	49.71	6.903	2	.032
3. Academic writing	35.04	41.85	46.24	3.392	2	.183
Final Grade	**34.56**	**42.21**	**49.93**	**6.280**	**2**	**.043**

Note: BL (n = 35) = Control group; UN (n = 24) = Prompting understanding group; RE (n = 22) = Prompting reflection group.

5.5.3 Perceptions of motivation and experiential learning

Table 5.8 demonstrates that there were no statistical significant group effects on perceived motivation and perceived experiential learning. These results indicate that prompting reflective thinking does neither promote negative feelings of students nor lower students' motivation to learn.

Table 5.8. Means and standard deviations of each subscale of the questionnaire (n=67).

Questionnaire subscales		**BL**		**UN**		**RE**	
		M	***SD***	***M***	***SD***	***M***	***SD***
Motivation	Interest/Enjoyment	5.48	.96	5.74	.99	5.74	.85
	Perceived competence	4.94	.67	5.18	.82	5.19	.53
	Value/Usefulness	5.97	.66	5.87	.92	5.88	.59
	Motivation overall	5.49	.59	5.62	.78	5.62	.58
Experiential learning	Active experimentation	5.63	.70	5.37	1.34	5.53	.58
	Concrete experience	5.80	.54	6.09	.72	5.84	.59
	Re-Contextualization	5.72	.59	5.73	.97	5.68	.56
	Reflective observation	5.61	.87	5.65	1.04	5.61	.80
	Abstract conceptualization	6.11	.54	6.11	.64	6.06	.88
	De-contextualization	5.86	.62	5.88	.80	5.83	.79
	Experiential learning overall	5.79	.57	5.80	.86	5.76	.64

Note: BL (n = 31) = Control group; UN (n = 19) = Prompting understanding group; RE (n = 17) = Prompting reflection group; *M* = Mean; *SD* = Standard deviation.

5.5.4 Effect of various demographic characteristics

Age, academic *performance,* prior *education*, working *experience,* and teaching *expertise* had no significant effect on the perceptions of motivation and experiential learning. However, the relationships between these and academic performance (final grade) were significant (Table 5.9). Students with more working experience significantly outperformed students with less working experience (U = 51, p < .001). Older students achieved significantly higher grades than younger students (U = 177, p = .004). Students coming from research-led universities appear to benefit more from reflection than students coming from universities of applied science, although only approaching a significant level (U = 355.5, p = .075).

Table 5.9. Analysis of the relation between academic performance (measured with final grade) and student characteristics.

Significance effect*	Mean Ranks		Mann-Whitney		
			***U* score**	***z* score**	***p* Value**
Age	YO = 20.14	OL = 35.96	177	2.9	.004
Education	HBO = 29.39	WO = 37.69	355.5	1.78	.075
Experience	LE = 10.67	ME = 36.07	510	3.92	< .001
Expertise	T = 30.61	NT = 34.78	441.5	.92	.358

Note: YO (n = 14) = students younger than 30 years; OL (n = 50) = students older than 30 years; HBO (n = 40) = students from universities of applied science; WO (n = 24) = from research universities; LE (n = 9) = students with less than five years of working experience; ME (n = 55) = with more than five years; T (n = 35) = students with teaching expertise; NT (n = 29) = students without teaching expertise.

5.6 Discussion and conclusion

This study aimed to bridge the gap between theory and experience by addressing both the processes of re-contextualization (by supporting students to apply theory to practical situations) and de-contextualization (by discussing experiences acquired in practical situations in relation to theory) in experiential learning. The specific aim was to understand how different levels of prompted reflection facilitate students to reflect and learn in an experiential learning environment.

First, regarding the relationship between different levels of prompted reflection and levels of reflection in students' writing, several conclusions can be drawn. While studies have shown that the majority of students need external support to engage in reflection (Coulson & Harvey, 2013; Dyment & O'Connell, 2011), the study described in this article reveals that prompts for reflection might provide such support, when carefully designed and provided. Prompting higher levels of reflection (reflection and critical reflection), rather than lower levels of reflection (habitual action and understanding), appeared promising. Since reflection and critical reflection are more challenging, the study shows that students remain on lower levels of reflection when not explicitly asked to go beyond understanding. As shown by Kember et al. (2008), reflection can be ineffective and expected learning outcomes may not emerge. Our research indicates that systematically prompting higher levels of reflection during experiential learning can have a positive influence on the reflection levels in students' written reflections. Second, with respect to the relation between different levels of prompted reflection and students' academic performance, the results provide evidence that prompting higher levels of

reflection correlates positively with academic writing. Student that were prompted at the reflection level achieve higher grades. Consistent with other evidence (Ghanizadeh, 2017), we could observe that students receiving higher level prompts outperform others on their reporting skills. More specifically, criteria for the *content* of reporting were scored significantly higher, where criteria for *scientific reporting* (such as the quality of the introduction, theoretical framework, methods, and results) were higher (and marginally significant). We did not find differences for criteria on *academic writing* (such structure, references and language use).

Third, with respect to reflection as a complex cognitive process (Liu, 2017; Ghanizadeh, 2017; Ryan & Ryan, 2013), the study demonstrated that systematically prompting reflection writing did not decrease students' perceived motivation, or their perceptions of usefulness, interest and enjoyment. Likewise, we did not encounter any effect of prompting level on perceptions of experiential learning. Students in all groups perceived the steps of experiential learning equally (and highly). Finally, the results of this study indicate that older students, students with more work experience and students coming from research universities outperformed students that were younger, less experienced and coming from universities of applied science. It seems that these groups of students benefit most from reflection prompts. This supports Mirriahi et al.'s (2018) argument that students with experience have more elaborated schemata for reflection.

The limitations of this study should be taken into account. First, the study was situated in a distance education context rather than the more traditional on-campus one. Participants were educational science students, generally accustomed to reflect about educational practice. These were postgraduate students, and given their greater exposure to the writing and also their different levels of maturity, that of undergraduates may be different. Results may be different in disciplines other than this, where written reflections are not that common or not carried out at all. The students in this study came from a more research-oriented university. Second, data was collected across two cohorts of students (February 2019 and September 2019), and only the students from the September cohort could be randomly assigned to two experimental conditions. The sample size was small. There is an emotional and embodied domain of reflection that can be so influential to academic performance and preparing future graduates as professionals and citizens, but this was not explored in the study. Performance in this study was measured by the final mark/grade on a particular written task, but of course is much more than simply a mark/grade. Future work is therefore needed that also looks at reflection in different disciplines, considers different levels of students, different types of universities and

different cultural contexts. Studies are needed that look into other measures than marks/grades, and take into account the complexities of reflection when it comes to the emotional and embodied aspect.

There are other recommendations to be derived from this study. Prompting the highest level of reflection (*critical* reflection) might produce even better results. The literature points out that critical reflection is more profound and more likely to involve deeper knowledge development (Kember et al., 2008). However, critical reflection in terms of writing cannot be taken for granted, as it is not an intuitive skill and it is highly challenging process, both emotionally and intellectually (Ryan & Ryan, 2013). We therefore encourage subsequent studies to use similar research designs to investigate differences between prompting for reflection and prompting for critical reflection. The results of this study indicate that demographic characteristics of students influence their benefit from reflection prompts. This insight helps when designing more effective learning environments. Although we had students share their reflective thinking (Clara et al., 2019), the question is whether prompted discussion and collaborative reflection can lead to better critical reflection and enhanced academic performance (Trede & Jackson, 2019). This leads to a final recommendation, that is, to investigate to what extent collaborative activities can be used to further support reflection in experiential learning environments.

Taken altogether, the findings of this study suggest that students should be prompted to reflect on higher levels when learning in experiential leaning environments. The following six guidelines are intended to assist practitioners in successfully facilitating reflection in their learning environments. First, to ensure that the learning environment mirrors the complexity of what needs to be learned, students should be guided toward reflection and critical reflection levels with explicit and clear prompts. Second, such prompts should address both knowledge re- and de-contextualisation (in accordance with the learning goals). Third, ensure that critical reflection is an element of the authentic context and aligned with the curriculum, learning goals, and potential learning pitfalls. Fourth, journal writing (by means of notes, reflection diaries, personal blogs, or forum posts) can be included for students to structure their reflective thinking. Fifth, consider integrating (formative and summative) feedback in the reflection process to support students in continuously improving both learning process and outcomes. Finally, we have argued that (collaborative) reflection could be situated within a group of learners. Such collaborative reflection can be achieved during group work, and enhanced by sharing reflection notes, providing peer feedback, and engagement in group discussion.

Chapter 6

The case of socially constructed knowledge through online collaborative reflection

This chapter examines how different levels of collaborative reflection influence learning processes and outcomes in higher education. Findings from the study within the context of an Educational Sciences Master course show that guiding students to share, to read, and above all to discuss written answers on reflection assignment from others can be helpful for a deeper and broader understanding and higher level of reflection. Discussing reflection from different perspectives were found to be related to perceived satisfaction with the learning process and the motivation to learn.

This chapter is based on: Radović, S., Firssova, O., Hummel, H. G. K., & Vermeulen, M. (2022). The case of socially constructed knowledge through online collaborative reflection. *Studies in Continuing Education,* 1–16, DOI: 10.1080/0158037X.2022.2029389.

6.1 Introduction

Reflection during learning can be considered as crucial. It is defined as a process of looking back at past experiences to form new understanding and steer future actions (Boud et al., 1985; Dewey 1933). Boud and colleagues (1985, p. 19) described reflection as an essential learning activity in which students "recapture their experience, think about it, mull it over and evaluate it". Reflection and related terms such as reflective practice, critical reflection, reflective thinking and reflexivity have become important processes supporting students' professional skills growth and academic knowledge development in authentic learning environments (Kember et al., 2008; Radović et al., 2021a; Splichal et al., 2018; Van Beveren et al., 2018). Based on the work by Dewey (1933), Kolb (1984) embraced reflection as necessary for the experiential learning cycle. It supports both processes of the cycle: 1) applying knowledge and skills to real situations (processes of re-contextualization - steps of active experimentation and concrete experience); and 2) generalizing acquired experience to more abstract knowledge (processes of de-contextualization - steps of reflective observation and abstract conceptualization) (Radović et al., 2020; 2021a).

Researchers agree that the quality and level of reflection during experiential learning can vary (Kember et al., 2008; Ryan, 2013). Kember et al. (2008), following the work of Boud et al. (1985) and Mezirow (1981), distinguished hierarchical levels of reflection along a depth continuum: from descriptive levels without significant thinking about topic (Understanding); towards more intensive reasoning, with existing understanding and fundamental belief being challenged as a result of conceptual conflicts (Reflection and Critical reflection). Many researchers argue that even when students are asked to articulate and reflect (Menekse et al., 2020; Splichal et al., 2018; Radović et al., 2021a), they remain at lower levels of reflection. However, prompting students to reflect at higher levels (both reflection and critical reflection) can significantly improve their academic performance (Radović et al., 2021a). This should be scaffold by complex of cognitive and deep-thinking prompts because it does not occur by itself (Menekse, 2020; Radović et al., 2021e; Schon, 1983; Van Beveren et al., 2018).

Reflection, as we defined the concept, is an individual cognitive endeavor that helps each student to better understand their strengths and weaknesses when learning (Rantatalo & Karp, 2016; Menekse, 2020; Splichal et al., 2018). However, there is a growing recognition that reflection has to be organized in a social context, as was described in the review by Høyrup and Elkjaer (2006) as 'collaborative reflection'. Following Vygotsky (1978), many research

studies have recently demonstrated the benefits of the social context for developing metacognitive and reflective skills (Prilla et al., 2020; Vuopala et al., 2016). A recent study by Clara et al. (2019) explains that sharing reflective writing between peers helps students to engage with new ideas and different perspectives. Liu (2017) further emphasizes that discussing reflection can promote more critical individual cognitive processes. It stimulates deeper processing of insights and supports the transition between steps in the experiential learning cycle (Radović et al., 2021a). An extensive research has showed that collaborative learning activities can be guided, clustered by roles and activities within groups, and planned to enhance learners' cognitive and metacognitive processes (Fischer et al., 2006). According to Fischer et al. (2006) and Weinberger et al. (2010), learners can be directed towards a joint goal - building individual knowledge from different perspectives, providing a solution to a problem, or jointly negotiate meaning. Their findings further point to the importance of supporting learners' social interaction needed for collaborative reflection and individual knowledge acquisition.

However, the structure of peer interaction seems to be the mediator of what students learn from collaborative interactions (Chinn et al., 2000). When discussing the variety of collaboration interactions, Bereiter and Scardamalia (1993), and later van Aalst (2009), made a distinction between social aspects of knowledge sharing and knowledge construction. *Knowledge sharing* refers to the simple transmission of information between people. In such social practices, shared ideas are not modified or developed by sharing mechanisms (Bereiter and Scardamalia, 1993). Despite the fact that a variety of information can be available and shared in a group, students' efforts are conceptualized as simple processes and without reorganizing previous knowledge into a new structure. Besides sharing, *knowledge construction* refers to processes by which students make ideas, concepts, or phenomena through active discussion. It is often associated with deep learning, which entails qualitative changes in the complexity of students' thinking and reorganizing previous knowledge into a new structure (van Aalst, 2009). Furthermore, knowledge construction happens when learners consider each other's shared information, assertions, and evidences for those assertions during argumentative discussions in the context of meaningful learning tasks (Bereiter and Scardamalia, 1993). As a recent study by Brouns and Firssova (2019) demonstrated, collaborative knowledge construction and exchanges between learners can be stimulated by task design and task relevance. Relevance and meaningfulness of the task leads to learners responding to the invitation to interact, share assignments, and give each other feedback.

6.2 Instructional approach for collaborative reflection

The social interaction needed for collaborative reflection, especially in distance higher education, can be enhanced by using technology. Extensive research on computer-supported collaborative learning (CSCL) focuses on improving interactions between learners (Vuopala et al., 2016), facilitating dialogue and joint knowledge construction (Bereiter & Scardamalia, 1993; Scardamalia & Bereiter, 2003; van Aalst, 2009), and providing tools for argumentation (Weinberger et al., 2010). Results show that asynchronous online discussions, usually in the form of discussions forum and email chats, are an important component of CSCL technology (Johnson & Johnson, 1996). Compared to synchronous communication, asynchronous discussions do not require real-time interaction between learners, and allow for a time delay that can be used for additional processing of information at learners' own pace (Kim et al., 2005) or for deeper and more critical thinking (Loncar et al., 2014). CSCL allows students to overcome space and time constrains in communication (Cho et al., 2016) and to build online communities (Loncar et al., 2014). Despite its many advantages, there are also several limitations to asynchronous discussions, such as difficulties in sharing non-textual feedback, the lack of spontaneous interactivity (Cho et al., 2016), and the low rates of contributions when compared to classroom situations (Splichal et al., 2018; Rantatalo & Karp, 2016).

Although technology can provide platforms for social interaction and asynchronous discourse (van Aalst, 2009), Kreijns et al. (2003) argued that the possibilities of technology do not guarantee the quality of learning. This is supported by Radović et al. (2021c; 2021f) who presented a set of (more Authentic, Reflective and Collaborative - mARC) instructional elements that may be useful to facilitate collaborative reflection. Their mARC model provides practical guidelines and insights into the process of creating and redesigning more experiential learning environments to support students' development of skills and academic knowledge. Regarding collaborative reflection the mARC model suggests that a learning environment should: 1) engage students within a community of practice in a cohort structure and allow discussion and joint re–evaluation of experiences and new knowledge; 2) consider different expertise as a resource during learning, and use the variety of group members' experiences to form new knowledge; 3) provide structure and guidance for students' collaborative activities, stimulate a debate on learners' conceptions, and allow for peer feedback; 4) encourage self–awareness within groups when fostering collectively shared performances or products; and 5) promote various perspectives as a resource for deeper reflection.

6.3 Research Questions

While previous studies have recognized that prompting students to reflect at higher levels (both reflection and critical reflection) can significantly improve learning outcomes, the extent to which group learning setting support reflection processes during experiential learning in higher education is not well-known and lacks empirical evidence. Therefore, the present study aims to contribute to the understanding of collaborative reflection by investigating the effects of two different degrees of complexity of social activities (namely *Socially Shared Reflection,* corresponding to knowledge sharing; and *Socially Discussed Reflection,* corresponding to knowledge construction). Three main research questions will be addressed:

> RQ 1. How does the different levels of collaborative reflection affect students' reflective thinking (1a) and their academic achievement (1b)?
>
> RQ 2. How does the different levels of collaborative reflection affect students' perception of their motivation (2a), perception of experiential learning (2b), and satisfaction with interactions in CSCL (2c)?
>
> RQ 3. How does the different levels of collaborative reflection affect the quantity (3a) and quality (3b) of learners' online discussions?

6.4 Method

The study was situated in the context of providing the starter course in our Master of Educational Sciences. This Master is offered as distance learning and targets professionals in education, mainly teachers who seek an academic degree, and want to combine work with study. The course under study allows students to develop insights into the way main learning theories influence educational design. They do it through case-study research of the congruence between learning theories translated in instruction at micro level and in curriculum design. In their learning activities students follow the four steps of the experiential learning cycle by Kolb (1984) to facilitate both processes of re- and de- contextualisation (Radović et al., 2021e).

To evaluate the effectiveness of different levels of collaborative reflection we used a mixed methods research design. Multiple data sources were used: final academic report assessments (as measure of academic performance); students' written reflection assignment (as measure of the level of reflection); students' contributions to asynchronous discussions (as measure of the

quality and quantity of discussions); and a post-test questionnaire (with measures on motivation, perception of experiential learning and usefulness of discussions). The study was approved by the Ethics Review Committee of the Open University of the Netherlands.

6.4.1 Participants

Participants of this study were students of two cohorts (September 2019 and February 2020) who completed the course and gave written consent to participate in the study ($n = 50$). Students enrolled in the September 2019 cohort were used as control group, further specified as the SSR (Socially Shared Reflection group, $n = 23$). Students enrolled in February 2020 cohort were used as experimental group, specified as SDR (Socially Discussed Reflection group, $n = 27$). Each group was allocated to the corresponding online learning environment. Table 6.1 provides a comprehensive picture of their demographics (twelve students did not fill in the questionnaire: six from SSR and six from SDR, so questionnaire data could be collected from 38 participants). Mann–Whitney U test showed no significant difference between two groups in respect to the demographic variables.

Table 6.1. Students' demographic information.

Category	**SSR (n = 17)**		**SDR (n = 21)**		**Total (n = 38)**	
	n	%	*n*	%	*n*	%
Gender						
Male	2	12%	6	29%	8	21%
Female	15	88%	15	71%	30	79%
Previous level of Education						
Professional bachelor/master	11	65%	18	86%	29	76%
University bachelor/master	6	35%	3	14%	9	24%
Experience in professional work						
0-5 years	1	6%	3	14%	4	11%
5-10 years	3	18%	3	14%	6	16%
>10 years	13	76%	15	72%	28	74%
Age	*M*	*SD*	*M*	*SD*	*M*	*SD*
In years	38.35	6.97	39.29	8.53	38.87	7.88

Note: SSR = Socially Shared Reflection group; SDR = Socially Discussed Reflection group; *M* = Mean; *SD* = Standard deviation.

6.4.2 Context

During a period of 11 weeks, students were guided towards course completion through a series of learning activities. The course was structured as a sequence of 6 learning tasks with a reflection recap assignment after each of the learning tasks. Students and teachers interacted asynchronously through discussion forum and regular synchronous meetings in a CSCL environment. Students worked individually or in groups, by studying material on learning theories, course and curriculum design, case design methodology, and on conducting research. They were encouraged to work together and could choose medium for communication freely. In the last week students completed the course by submitting individually their written academic reports for summative assessment.

The control condition (SSR) prompted students to share their answers to the reflection assignments in a discussion forum. Students were supported to: 1) recapitulate the relevant learning theme; 2) write an answer (with a maximum of three hundred words) to the respective reflection prompt; and 3) share their answer with their peers by using the discussion forum (Table 6.2). This is in line with the knowledge sharing proposed earlier by Bereiter and Scardamalia (1993) and later by van Aalst (2009). The experimental condition (SDR) prompted students not just to share but also discuss their reflections (Table 6.2). Students in SDR were prompted to discuss learning dilemmas, conflicting ideas, and different perspectives that individual reflections brought up. They were asked to give compliments, provide assistance, highlight concerns, and suggest an additional course of action in relation to both knowledge re- and de- contextualization. This is in line with the knowledge construction (Bereiter & Scardamalia, 1993; Brouns & Firssova, 2019; van Aalst, 2009). The five phases for collaborative reflection are outlined in Table 6.2 and described further on bellow the table. Illustrations of the instructions given to students for carrying out reflection assignments are included in Appendix C.

Table 6.2. Details of social aspects of collaborative reflection in two CSCL environments.

The phases of social knowledge construction through curriculum-related reflection	**SSR**	**SDR**
Phase 1: Reflection writing.	The first phase	The first phase
Phase 2: Sharing individual reflections.	The second phase	The second phase
Phase 3: Being aware of different ideas.	The final phase	The third phase
Phase 4: Discussing Reflection.	-	The fourth phase
Phase 5: Exploring new course of action.	-	The final phase

Note: SSR = Socially Shared Reflection; SDR = Socially Discussed Reflection.

Phase 1: Reflection writing. During the first phase, students are asked to individually provide answers to a curriculum-related reflection assignment. The aim of this assignment is to guide students in reflecting on their concrete learning experience and learning tasks. Students are prompted to explore thoughts and knowledge, to generalize learning experience, and explain theoretical understanding. The purpose of this part of assignment is that students learn to reflect both in-action and on-action in writing.

Phase 2: Sharing individual reflections. The purpose of the second phase is the sharing of individual reflections. Since each of the reflection assignments follows after a specific learning task, students are encouraged to use the CSCL environment when learning dilemmas arise from authentic learning situations. Students are introduced to different perspectives and different points of view from their peers on their concrete learning experiences.

Phase 3: Being aware of different ideas. The purpose of the third phase is to help students become aware of dilemmas and different viewpoints on similar learning experiences. Comparing opposing reflections, ideas and beliefs from yourself and others requires a process of meaning construction. This phase still lacks the aspects of collaborative reflection, collective evaluation, or joint accumulation of ideas and beliefs.

Phase 4: Discussing Reflection. In this phase students (only SDR group) are encouraged to collaboratively reflect by discussing each others' reflections and dilemmas. They are asked to give compliments, provide assistance, highlight concerns, and suggest additional courses of action. Furthermore, students are urged to act with openness and trust, and stimulated to engage within the learning community. It is expected that discussing dilemmas, conflicting ideas and different perspectives can lead to a deeper and broader understanding of the learning experience and increase knowledge. During this phase, new ideas can emerge and a variety of ideas and beliefs are shared and discussed.

Phase 5: Exploring new course of action. The final phase (only SDR group) deals with the determination of new courses of action. Socially constructed knowledge through reflection should lead to the reconsideration of earlier insights in the light of new (sometimes confronting) insights and the perspectives of peers. Although Phase 4 *Discussing Reflection* involves joint knowledge construction thought discussion, Phase 5 is an individual effort including improving old ideas and transcending the former level of understanding.

6.4.3 Measuring instruments

Levels of reflection in written answers on reflection assignment. Kember et al.'s (2008) topology was used to measure the level of reflection. Following the results from the recent study (Radović et al., 2021a) the levels 'Habitual actions' and 'Understanding' represent levels of understanding, while the levels 'Reflection' and 'Critical reflection' represent levels of reflection. As recommended by the topology, each reflection text was analysed and categorised according to the highest reflection level encountered.

Academic performance. Students were expected to demonstrate academic achievements as researchers by conducting a study, presenting it orally and writing it up in a report. Effects on academic performance were measured by assessing their final assignments (academic report writing).

Quality of asynchronous discussions. A coding scheme described by Johnson and Johnson (1996), and later supplemented by Curtis and Lawson (2001), was used to analyze the content of students' posts on reflection assignments. Coding categories represent important aspects of collaborative communication: 1) Contributions to task and knowledge construction; 2) Looking out for input and assistance; 3) Social interaction; 4) Monitoring group work; and 5) Planning group work. The units of analysis were discussion posts, rated according to the codes and subcategories.

The questionnaire. Based on the research questions, a dedicated questionnaire was constructed (containing 32 items, each to be scored on a seven-point Likert scale, with values ranging from one ("totally disagree") to seven ("totally agree")). From Ryan and Deci's (2000) Intrinsic Motivation Inventory (IMI), we used two subscales (a total of fourteen items): "*Interest/ Enjoyment*" (IMI.IE, seven items) - perception of interest and enjoyment; and "*Value/usefulness*" (IMI.VU, seven items) - perception of benefits from the activity. The IMI has been used and validated in various studies on motivation (e.g., Klaeijsen et al., 2018). The complete (validated) questionnaire from Young et al. (2008) was used (a total of twelve items) to measure the quality of experiential learning. This questionnaire had four dimensions (each containing three items) that estimate learners' awareness of *Active Experimentation* (EXP.AE) and *Concrete Experience* (EXP.CE) as the two steps of Re-Contextualisation; as well as *Reflective Observation* (EXP.RO) and *Abstract Conceptualization* (EXP.AC) as the two steps of De-Contextualisation. To measure students' satisfaction with the *Interactions* (INT.RT) on

the discussion forum we used one subscale (five items) from Driver's (2002) instrument. Last ten items were used to estimate students' perceptions of academic benefits from the *Asynchronous discussions* (INT.AD) and *Synchronous discussions* (INT.SD) scales from work by Lucas (2003) and Ebrahimi et al. (2017). Background variables were used to collect learner's demographic information on: Age, Previous level of Education, Experience in professional work, and Expertise during professional work.

The debriefing session. To gain deeper insights, into students' activities and perception of the academic benefits and interactions in the discussion forum, quantitative data were supplemented with qualitative data obtained from semi-structured debriefing session. The debriefing session was combined with the questionnaire and stimulated by seven open questions on which students provided written answers. The full list of questions are given in Appendix D.

6.4.4 Data analysis

The internal consistency of each sub-scale of the questionnaire was calculated using the Cronbach's α statistic. As indicated in earlier works (e.g., Taber, 2018), sub-scales that have a low number of items, as well as non-normally distributed data, tend to have a lower reliability. Two dimensions (with three items) yielded a moderate α below .6, three dimensions had good reliability above .7, and four dimensions had high reliability scores above .8 (see Table 6.7). Overall, Cronbach's α statistic indicated that subscales achieved adequate internal consistency.

Furthermore, to analyze reflection level in written answers on reflection assignment, each contribution was first translated from Dutch to English (to facilitate analysis by the non-native researcher), and then rated according to Kember et al.'s (2008) topology, in order to establish the highest reflection level encountered. To analyze the content of students' posts on reflection assignments, a coding scheme described by Johnson and Johnson (1996), and later supplemented by Curtis and Lawson (2001), was used. They introduced categories varying from contributions to task and knowledge construction, through social interaction, to monitoring and planning group work (complete coding scheme with examples is given in Appendix E).

As much of the data (except EXP.CR, EXP.AE, and IMI.VU) were not normally distributed, non-parametric tests were used. To evaluate the relation between experimental condition with

reflection level in students' written answers and academic reporting, Mann-Whitney *U* tests were conducted (section 3.1). The Mann-Whitney U test was also applied to analyse the relation between the level of collaborative reflection and the number of students' contributions (section 3.2). Further, to determine the correlations between subscales in the questionnaire (section 3.3), a Spearman rank-order correlation was run. Mann-Whitney *U* tests were used to analyse the relationships between of collaborative reflection levels on motivation and experiential learning. Finally, examples of the students' responses are included to provide some typical illustrations of the perception of the learning process and collaborative reflection.

6.5 Results

6.5.1 Reflection level in written answers on reflection assignment and academic performance

We collected a total of 204 written answers on reflection assignment from the discussion forum. Numbers and percentages of students' contributions for different levels of reflection are presented in Table 6.3. Students in the SSR group ($M = 4.91$, $SD = .29$) were more responsive in completing reflection assignment then students in the SDR group ($M = 4.14$, $SD = 1.67$), and contributions in the SDR group scored more frequently on the higher reflection level (84%) when compared to contributions in the SSR group (74%) (Table 6.3).

Table 6.3. Numbers and percentages of students' written answers on reflection assignment taken from the discussion forum at different levels of reflection.

Experimental condition	**Number of completed reflection assignment**			**Achieved levels of reflection in written answers**		
	M	*SD*	Total		Total	%
SSR group ($n = 23$)	4.91	.29	113	Understanding level	29	26
				Reflection level	84	74
SDR group ($n = 22$)	4.14	1.67	91	Understanding level	15	16
				Reflection level	76	84

Note: SSR = Socially Shared Reflection group; SDR = Socially Discussed Reflection group

Regarding the relation between experimental condition and reflection level in students' written answers on assignments, results show that students from the SDR group (Mean Ranks = 27.02) reached higher levels of reflection ($U = 164.5$, $p = .038$) when compared to students from the SSR group (Mean Ranks = 19.15) (Table 6.4).

Table 6.4. The effects of collaborative reflection on contributions achieved high level of reflection.

	Mean Ranks		Mann-Whitney		
			U score	*z* score	*p* Value
Percentage of contributions achieved level of reflection	SSR = 19.15	SDR = 27.02	164.5	-2.075	.038

Note: SSR (*n* = 23) = Socially Shared Reflection group; SDR (*n* = 22) = Socially Discussed Reflection group; The different number of participants are due to limited students' participation.

Regarding the relation between collaborative reflection level and academic performance, no significant differences between groups were observed. In other words: although prompting to discuss each other's reflections helped students to achieve a higher level of reflection in their own writing, it did not affect their academic performance. More qualitative findings from the debriefing session indicate that students do not mention any direct benefits of reflective activity on their academic performance. However, they did recognize the importance of the social context for reflection, and stated that the ideas of others contributed to their knowledge construction and helped them to successfully complete reflection assignments. Students stated for example:

> *The approach for the collaborative reflection was mainly focused on sparring with fellow students, reviewing and discussing other reports, reading discussions from fellow students and being critical yourself. I tried to combine this with what I learned and what I (and also someone else) can were these 1get out of it.* (Student 30)

> *Although it is, of course, a time investment in someone else, it also helps me enormously, because when I comment, I am forced to be sure and to formulate the issues I raise well. Moreover, other people's ideas and insights are added to my knowledge construction (or at least have an influencing effect).* (Student 39)

6.5.2 Students' asynchronous discussion

To examine students' contributions to asynchronous discussions, we first analysed the effects of collaborative reflection level on a total of 128 discussion posts related to reflection assignments (Table 6.5). Students from SSR group participated in discussions by posting 2.67 (*SD* = 1.67) messages average per person, while students from the SDR group posted an average of 7.33 (*SD* = 5.93) messages (Table 6.6). The results of Mann-Whitney tests demonstrated that students from SDR group (Mean Ranks = 17.5) posted significant more messages during asynchronous discussions (*U* = 48, *p* = .037) than students from SSR group (Mean Ranks = 11.2).

Table 6.5. The effects of collaborative reflection level on the number of discussions related to reflection assignments.

	Mean Ranks		Mann-Whitney		
			U score	*z* score	*p* Value
Number of discussion posts	SSR = 11.2	SDR = 17.5	48	-2.083	.037

Note: SSR (*n* = 15) = Socially Shared Reflection group; SDR (*n* = 12) = Socially Discussed Reflection group; The different number of participants are due to limited students' participation.

The more qualitative analysis of the content of students' posts on reflection assignments (Table 6.6), indicate that the students' participation can be characterized as contributions to task and knowledge construction (85% in SSR and 70% in SDR) more often than looking out for input and assistance (8% in SSR and 13% SDR), and social interaction (8% in SSR and 17% SDR). In the study, we found no evidence of discussions related to planning and monitoring group work, as there was no planning of group work and monitoring required. It appears that most of the discussions focused on providing feedback on proposals, providing statements and viewpoints from others (FBG), explaining concepts and further elaborating position (EXE), and challenging others to engage in debate (CHS). Furthermore, some social interactions contributed positively to social cohesion. Students appreciated the help, complimented others on their good work, and valued the assistance offered (8% in SSR and 17% in SDR).

Table 6.6. Analisis of students' discussion posts according to different categories.

Code	Description of codes used to describe posts in asynchronous discussions	SSR		SDR	
		n	**%**	***n***	**%**
Contributing to task and knowledge construction		34	84	62	70
HEG	Responding to requests from others	2	5	6	7
FBG	Providing feedback on contributions	16	40	20	23
ERI	Exchanging resources and information	0	0	5	6
SKN	Sharing existing knowledge with others	4	10	4	5
CHS	Challenging others to engage in debate	4	10	11	13
EXE	Explaining or elaborating	8	20	16	18
Seeking input and assistance		3	8	11	13
HES	Seeking assistance from others	1	3	7	8
SFB	Seeking feedback to a position advanced	2	5	3	3
AEF	Urging others to contribute	0	0	1	1
Social interaction - Comments unrelated to the group task		3	8	15	17
Monitoring - Comments about the group's processes		0	0	0	0
Planning - Planning group work and shared tasks		0	0	0	0
TOTAL		40	100	88	100

Note: SSR (*n* = 15) = Socially Shared Reflection group; SDR (*n* = 12) = Socially Discussed Reflection group; The different number of participants are due to limited students' participation.

When students explain why they comment on particular reflections and what drives their participation in asynchronous discussions, they usually point out that they contributing when it would be useful, or if something in the text is interesting or intriguing. Others stress that they comment when they come across specific questions from their colleagues and want to help them with problems or dilemmas. In both cases, the students' participation can be characterized as task and knowledge oriented, as is clearly illustrated in the next comments:

> *[I made comments] if something in their text interested or touched me, so out of impulse and interest*. (Student 31)

> *I responded to messages in which students themselves indicated that they had doubts about something, or had a question I could answer.* (Student 37)

At the end, a group of students who did not comment at all, explained that no discussion was mandatory for receiving the final grade, and also indicated that various practical issues had hindered participation, such as lack of time and flaws in study planning. This becomes clearer when analysing some of students' comments during debriefing:

> *Instructions for collaborative reflection were clear enough. But they didn't feel obligated, so I didn't comment.* (Student 25)

6.5.3 Students' motivation, perception of experiential learning, and interaction during discussions

Our analysis shows that twenty-two correlations between all sub-scales of the questionnaire were found statistically significant (see Table 6.7). First, the Spearman test indicates there was a strong and positive correlation between all subscales of motivation (IMI) and experiential learning (EXP). Increases of overall motivation were related with increases of perception of the overall experiential learning characteristics. However, the Mann Whitney U test shows no significant difference between the SSR and SDR groups regarding motivation and experiential learning (and its subscales). Students rated these constructs equally in both experimental conditions. The group interaction and collaborative reflection allowed students to focus on the experiential learning and help each other:

> *Collaboration with fellow students was very positive. The experiences I could share with them gave me different insights. This makes me feel like I was learning.* (Student 18)

Collaboration reflection with others was pleasant. You share what's important and you sharpen each other's perspective. (Student 22)

Second, when students perceive more educational benefits from reflection assignments (INT.RT), they appear better able to engage in steps of de-contextualisation of experiential learning (with EXP. RO r_s = .69, p < .01 and EXP.AC r_s = .60, p < .01). In addition, their reading and responding to others (INT.RT) is correlated with the perception of interest and enjoyment (IMI.IE) (with r_s = .47, p < .05), and with the satisfaction with Asynchronous discussions (INT.AD) (with r_s = .44, p < .05). Other positive correlations were found between the experimental condition and students' participation in discussions (N.COM), as well as with achieved levels of reflection (P.REF), as already mentioned in sections 3.1 and 3.2.

Table 6.7. Cronbach's α and Spearman's rank-order correlations.

Questionnaire subscales	**N**	**α**	**IMI.IE**	**IMI.VU**	**EXP.CE**	**EXP.RO**	**EXP.AC**	**EXP.AE**	**INT.RT**	**INT.AD**	**INT.SD**	**CON**	**N.COM**	**P.REF**
Interest/Enjoyment (IMI.IE)	7	.70	1											
Value/Usefulness (IMI.VU)	7	.73	.78**	1										
Concrete experience (EXP.CE)	3	.76	.65**	.77**	1									
Reflective observation (EXP.RO)	3	.59	.43**	.60**	.65**	1								
Abstract conceptualization (EXP.AC)	3	.81	.59**	.82**	.80**	.67**	1							
Active experimentation (EXP.AE)	3	.46	.44**	.41*	.50**	.54**	.36*	1						
Interactions (INT.RT)	6	.86	.47*	ns	ns	.69**	.60**	ns	1					
Asynchronous discussions (INT.AD)	4	.85	ns	ns	ns	ns	ns	ns	.44*	1				
Synchronous discussions (INT.SD)	4	.92	.48*	.62**	ns	ns	ns	ns	ns	.50*	1			
Condition			ns	ns	ns	ns	ns	ns	/	/	/	1		
Number of comments (N.COM)			ns	ns	ns	ns	ns	-.46*	ns	ns	ns	.41*	1	
Reflection Contributions (P.REF)			ns	ns	ns	ns	ns	ns	ns	ns	.48*	.31*	ns	1

Note: * = Correlation is significant at the 0.05 level (2-tailed); ** = Correlation is significant at the 0.01 level (2-tailed); ns = not significant; Condition: 1= SSR group, 2 = SDR group; N = Number of items in subscale; α = Cronbach's alpha.

Finally, the means and standard deviations of all items in the INT.RT scale (perceived value for sharing and discussing) are given in Table 6.8. Although all items were valued positively, it seems that the most appreciated educational benefits of reflection assignments within asynchronous discussions were found to be: a) exploring different perspectives on the topics (M = 5.67, SD = 1.02), b) being able to better understand the theory (M = 5.52, SD = 1.17), c) using theory to describe practice experience (M = 5.62, SD = 1.20), and d) to improve writing skills (M = 5.57, SD = 1.29).

Table 6.8. SDR students' perceptions about values from sharing and discussing reflection assignment.

Items from Reflection assignment (INT.RT) subscale	***M***	***SD***
Working out reflection assignments, reading and responding to others helped me to…		
… carry out the reading and study assignments.	5.33	1.35
… explore different perspectives on the topics.	5.67	1.02
… to better understand the theory.	5.52	1.17
… to use the theory to describe practice.	5.62	1.20
… to discuss different ideas that are not addressed in the course material.	5.00	1.61
… to improve my writing skills	5.57	1.29
Overall values	5.45	0.99

Note: 7 point Likert Scale (1-min, 7-max); *M* = Mean; *SD* = Standard deviation; *n* = 21 (SDR group).

6.6 Discussion

While prior studies have explored the role of reflection prompts on students' academic performance and motivational factors (Menekse et al., 2020; Radović et al., 2021a), the extensive literature (Clara et al., 2019; Høyrup & Elkjaer, 2006; Harford & MacRuairc, 2008), acknowledged that students should be given the opportunity to reflect in a social context. Nevertheless, the impact of such social context on reflection during experiential learning within formal academic master's program remains largely unexplored. Deepening our prior research results (Radović et al., 2021a), in this paper we presented empirical evidence on how different settings of collaboration can support reflection, and influence learning process and outcome.

Regarding the *first research question*, we found the level of students' reflective thinking indeed differed statistically between the two groups, with students from the prompted discussion group (SDR) more often reaching higher levels of reflection (reflection and critical reflection) than students from the sharing group (SSR), as was evidenced by their written answers on reflection assignment to the discussion forum. From the cognitive perspective, the social aspect of discussing reflection not only allows students to expose their knowledge and learning experiences but also lets them reevaluate their understandings and generate more critical reflections. Moreover, the fifth step of collaborative reflection lead students toward the reconsideration of earlier insights in the light of new (sometimes confronting) insights and transcending the former level of understanding. Regarding the academic achievement, we found no significant differences between the two groups, as could have been evidenced by the

quality of their report writing. The similar results was found in the study by Reed et al. (2019) who acknowledged that peer-to-peer discussion did not contribute to greater improvements in students' knowledge. However, an analysis of demographic characteristics in our study revealed no significant differences among students. This finding is quite noteworthy as the previous study that investigated effects of individual reflection in a similar context (Radović et al., 2021a) find older students, as well as students with more work experience and those students coming from research universities, have better grades than students that were younger, less experienced, and coming from higher vocational education. This further suggest that collaborative settings supported sharing of reflective thinking and expertise, and proved to be of equal benefit to all students.

Regarding the *second research question*, we found no significant difference between the two groups regarding motivation and interest (first part of the question), as well as perceptions of experiential learning (second part of the question). Students rated these constructs equally in both experimental conditions. We found positive and significant correlations between all subscales of the motivation (IMI) and experiential learning (EXP) scales. These perceptions of interest and enjoyment were correlated with the perception of educational benefits, so affected their satisfaction with the interactions in CSCL (third part of the question). Regarding the social organization of collaborative reflection, five phases proposed in this study (Reflective writing, Sharing individual reflections, Being aware of different ideas, Discussing Reflections, and Exploring new course of action) appear to facilitate and maintain successful (collaborative) reflection and (individual) knowledge construction.

With regard to the *third research question*, the results of the analysis indicate an effect of the level of reflection on the amount of discussion (first part of the question). Students from the SDR group posted significantly more messages in relation to reflection assignments in the discussion forum during asynchronous discussions than students from the SSR group. The qualitative analysis (second part of the question) reveals various approaches for collaborative reflection, like: sparring with fellow students, reviewing and discussing other reports, reading reflections and discussions from others, and being critical. When students explain why they engaged with discussions, they usually point out knowledge-related issues and providing help to others for better understanding. Furthermore, students in the SDR group mention various benefits of asynchronous discussions: exploring different perspectives on the topics, being able to better understand the theory, using theory to describe practical experiences, and improve

writing skills. Some of these results do not concur with other studies on CSCL. For instance, Vuopala, Hyvönen and Järvelä (2016) found that students' discussions remained at superficial levels, students rarely exchanged deep theory-based knowledge, and mostly contributed by providing short statements without any explanation. On the contrary, we see an indication that reflection assignments can be used during online distance learning to focus students' asynchronous discussions on knowledge-related communication towards (individual) knowledge construction. As such interactions cannot be expected to emerge in open online environment by default (Brouns & Firssova, 2019; Chinn et al., 2000), the present study highlights collaborative reflection as a tool to support discussion and argumentation, and to provoke the exchange of different perspectives during online experiential learning.

Several *limitations* of this study should be taken into account. *First*, our sample size was small and participants were students of an open university providing distance education, so our findings are not directly comparable with other levels of education, and hold limited generalizability to other face-to-face settings. *Second,* the course under study was an introductory course that lasted three months, and most participants did not know each other before the course. Both factors may explain limited participation in the discussions during collaborative reflection (Curtis & Lawson, 2001; Vuopala et al., 2016). *Third*, we tried to stimulate sharing and discussion by providing students instructions with prompts or hints to do so, but this was to be followed up on a mere voluntary basis, and students could not expect to receive any direct individual benefit or achieve any common purpose in doing so. *Fourth*, the study only examined the experience of individuals constructing knowledge through *asynchronous* collaborative reflection in the general discussion forum. We did not collect students' *synchronous* online discussions and group activities, or any other asynchronous discussions that might have happened beyond the discussion forum (e.g., personal emails, Facebook or phone text messages). Finally, a recommendation for future studies: encouraging the highest level of reflection (critical reflection) might produce even better results. Critical reflection is more profound and more likely to lead to deeper knowledge development, but it is also a very challenging process that may hinder learning process. So we encouraged subsequent studies to use collaborative settings and a similar research design as introduced in the present study, to examine the differences between prompting for reflection and prompting for critical reflection.

Taken altogether, the findings of this study suggest that reflection should be fostered beyond traditional approaches (mainly focused on cognitive individual elements) towards a sociocultural framework grounded on the social activity of reflection. Students should be encouraged to collaboratively reflect by discussing each other's reflections and dilemmas (step four of collaborative reflection), but also to individually reconsider earlier insights in the light of new (sometimes confronting) insights (step five of collaborative reflection) The following five practical suggestions are intended to assist practitioners in successfully facilitating collaborative reflection in their learning environments. First, students should be guided towards collaborative reflection and critical reflection levels with explicit and clear prompts. Second, such prompts should address both structure and guidance for students' collaborative activities through five phases: 1) Reflection writing; 2) Sharing individual reflections; 3) Being aware of different ideas; but also very important 4) Discussing, conflicting ideas and different perspectives; and 5) Exploring new course of action. Third, ensure that students are asked to give compliments, highlight concerns, and discuss dilemmas, conflicting ideas and different perspectives in relation with the curriculum, learning goals and potential learning pitfalls. If there is a critical stance regarding each other's contributions, ideas and comments there will be construction of a new understanding and deeper reflection. Fourth, consider integrating incentive mechanisms for reflection activities to stimulate students in continuously sharing and discussion. Finally, since reflective thinking is not a one-time activity, but part of lifelong learning, we recommend implementation and practicing reflection over a longer period of time, or over more academic courses or years. In this way, reflective thinking could become a habit of the mind rather than only the superficial and obligatory part of the course design. This study can be considered as a first step towards rethinking the way online and distance education can be organized to allow for collaborative reflection and to support students to become more critical and profound in constructing their knowledge during group discussions.

Chapter 7

General conclusion and discussion

This chapter reports on the process of redesigning an experiential learning environment throughout iterative design-based research. The results of design based research demonstared that the model offers powerful practical guidelines for experiential learning design. Findings show that application of the model: a) improves students' academic achievement, b) helps students to engage with both re- and de-contextualisation of knowledge, and c) improves reflection processes during learning. The study proposes that experiential learning, aligned with the pillars of mARC model, can successfully support learners in their effort to create knowledge through practical experience.

This chapter is based on: Radović, S., Hummel, H. G. K., & Vermeulen, M. (2021). Design–based research with mARC ID model: Designing experiential learning environments. *Learning Environments Research, 1-20, DOI: 10.1007/s10984-021-09394-7.*

7.1 Introduction

In recent decades the necessity of lifelong learning has become a popular drive underneath many educational reforms and policy plans (OECD, 2018). In the context of higher education, more attention has been given to supporting students in linking their learning experiences in practice to academic knowledge growth (Heinrich & Green, 2020). The experiential learning theory, as developed by Kolb (1984), recognises that bridging practical experience and theoretical knowledge is crucial for education. Kolb describes learning as a cyclic process of four steps: concrete experience (CE), reflective observation (RO), abstract conceptualization (AC) and active experimentation (AE) (Kolb, 1984). While learners follow the cyclic steps, they get the opportunity to construct knowledge arising from concrete learning experiences and converting it into abstract generalizations (de–contextualising knowledge), but also from applying this new generic knowledge in other learning experiences (re–contextualising knowledge) (Lindsey & Berger, 2009; Radović et al., 2021e; Reigeluth & Carr-Chellman, 2009).

Within formal education, several learning benefits are expressed for experiential learning. One of the most significant is supporting students in developing deeper understanding and broader knowledge (Kreber, 2001). Experiential learning also contributes to students becoming more thoughtful, reflective, and critical (Roberts, 2018). Furthermore, students report to be more motivated, to feel better as a learner, and to believe in the benefits of the course. Finally, literature indicates that students are encouraged to grow self–development skills and develop personal attitudes (personal attributes, communication abilities, self-awareness) when linking their learning experience to academic knowledge development (Coulson & Harvey, 2013).

A recent review study (Radović et al., 2021e) on experiential learning revealed a variety of instructional strategies to be used when supporting students, such as: providing real-world contexts of learning (including internships, practicums, fieldwork, observational activities, and service learning); offering more active learning (for example role-playing, serious games or simulations, research projects, case studies and scenarios, and various types of problem-based tasks); developing relevant knowledge, skills, and professional competencies in a work- or community-based learning context (including cognitive apprenticeships, guided participation, and legitimate peripheral participation); and often by engaging students with critical thinking, generalization, and reflection activities. However, although a number of instructional strategies and variants of experiential learning have been proposed (Bergsteiner & Avery, 2014; Heinrich

& Green, 2020; Young et al., 2008), higher education institutions are often criticised for failing to fully embrace experiential learning instruction (Groves et al., 2013; Roberts, 2018).

There are several learning design factors that lead to superficial relation between experience and knowledge. First, educators have limited knowledge of design based processes of developing experiential learning instruction (Kreber, 2001; Young et al., 2008). As a result, students report to engage in the experience at a superficial level, unable to perceive the authentic, reflective, or social aspects of the learning environment (Ash & Clayton, 2004; Reeves et al., 2005). Second, educators miss the potential to deepen their educational design, instruction, assessment, and learning context in order to facilitate a more experiential learning process (Heinrich & Green, 2020). Decisions need to be made about the learning content, authentic tools and resources, as well as timing of experiencing and reflecting, and sequence of these learning activities within the group of learners (Reeves et al., 2005). Making such instructional choices is the process which requires careful and rigorous planning. Finally, research studies argue that instructional gaps in the learning design reduce educative opportunities and learning benefits (Kreber, 2001). Loosely implemented learning designs could result in students' confusion, inability to follow the cyclic steps of experiential learning, and hinder knowledge de- and re-contextualisation (Heinrich & Green, 2020; Radović et al., 2021f).

7.2 mARC ID model for more experiential learning

Designing experiential learning in online education and adapting it to the needs of students in a specific context is not a simple and straightforward process (Radović et al., 2021e; Heinrich & Green, 2020; Coulson & Harvey, 2013). Situated in results of the recent review study that presented facilitating and hindering factors influencing experiential learning processes, Radović et al. (2021f) crafted mARC as an Instructional Design (ID) model for designing experiential learning environments. They first pointed out important instructional elements, then described and classified them, drew causal relationships, and finally provided design guidelines for applying the model (Figure 7.1) (Radović et al., 2021f).

While the Kolb's model describes how experiences and abstract thinking influence each other, the mARC model points out a comprehensive set of instructional elements organized within the three pillars of Authenticity, Reflection, and Collaboration. Thus, three overall design requirements have to be met: a) Presence of real world context to build academic knowledge

over real practice settings (Authenticity); b) Possibilities for reflection during learning and experiencing (Reflection); and c) Construction of knowledge based on different perspectives and social learning activities (Collaboration) (Radović et al., 2021e).

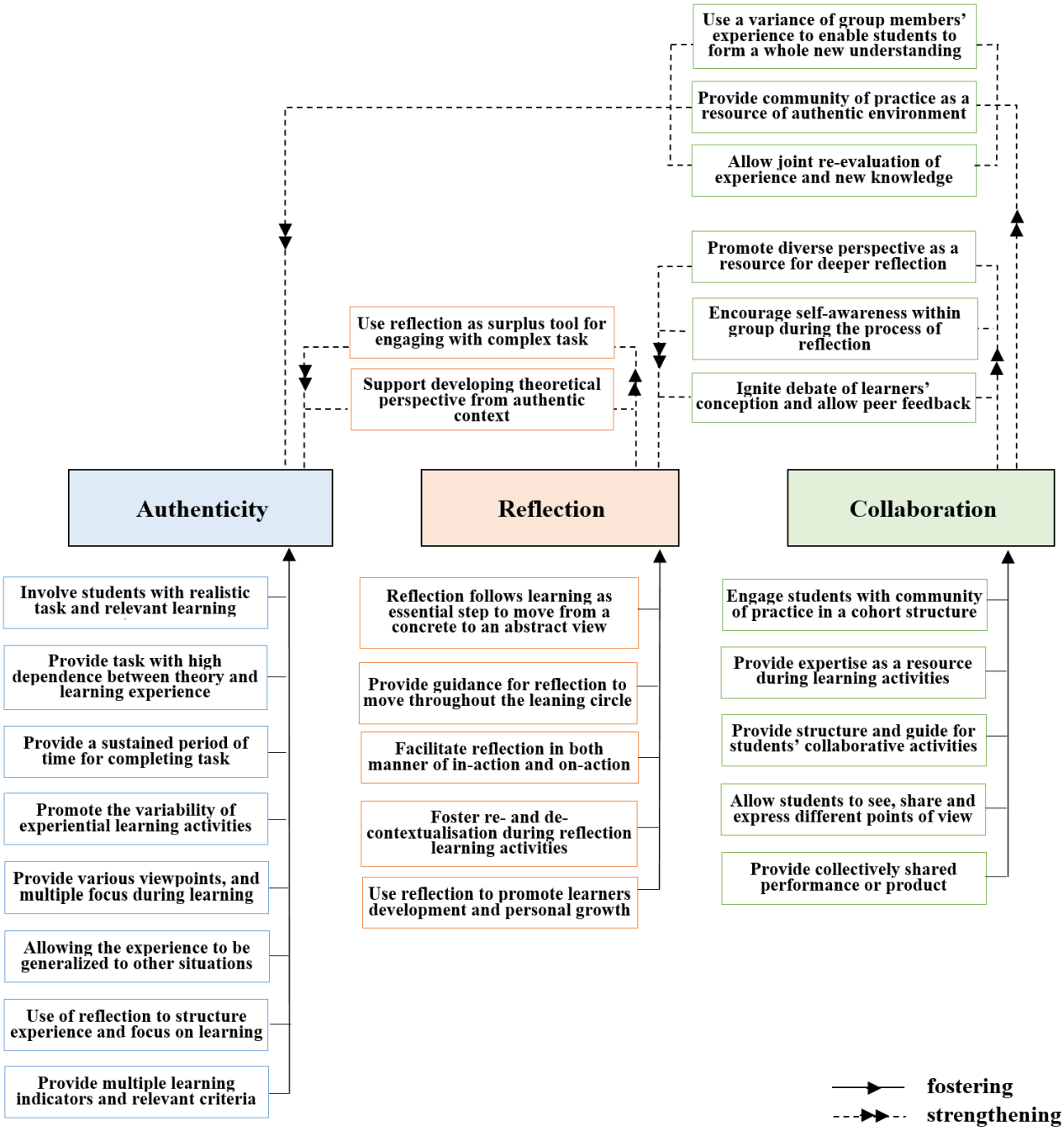


Figure 7.1. The mARC instructional design model.

7.3 Iterative design approach with mARC

The mARC model is designed to improve educational practice through an iterative process of design, development, implementation and analysis in real-world educational settings (Reeves et al., 2005). Figure 7.2 introduces three stages for developing complex and rich experiential learning environments (Plomp, 2007). The whole process is not carried out as completely predefined from the beginning, but depends on the results of previous design stages. Hence, the knowledge generated during each stage of the design based process is used to refine the following design stage, and as basis for the implementation of instructional elements of the following phases.

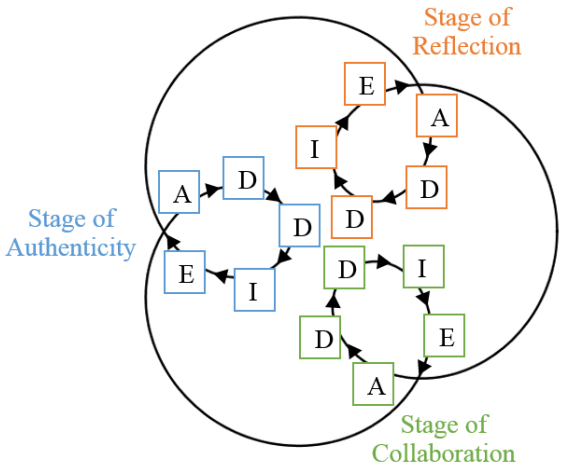


Figure 7.2. Three stages of learning environment redesign cycle according to three pillars of the mARC model (each including ADDIE phases).

7.3.1 Pillar of authenticity

The idea that learning activities need to be more authentic and work–oriented was recognized during the mid–1980s (Villarroel et al., 2020). National Society of Experiential Education (NSEE, 1998) underlie that the experience must have a real world context and be meaningful in reference to an applied setting or situation. According to Gulikers et al. (2004), the authenticity of learning environment is defined and determined by the extent to which professional situations, tools, and skills (represented in a learning environment), are relevant to the learner. This is extended by Mitchell (2008) who emphasises the importance of authentic social relations between faculty, student, and professional or service community during learning.

To ensure that experiential learning environments reflect the complexity of professional situations and work contexts mARC model suggest that *students should be involved with realistic tasks and relevant learning* (A1), where *the task affords a high dependence between theory and learning experience* (A2). It may be necessary to ensure that learners *have sustained periods of time for completing task* (A3) and *observe the variability of experiential learning activities* (A4). It is recommended that teachers *provide various viewpoints on practice, and multiple foci during learning* (A5) and *allow the learning experience to be generalized to other (different) situations* (A6). Moreover, reflective learning activities should not only be seen as an extra layer of complexity, but as a way *to structure experience and focus on learning* (A7). The final recommendation that arose from the pillar of authenticity of mARC is to *provide multiple learning indicators and relevant criteria* (A8) that learners have to meet in their real–life or carriers.

7.3.2 Pillar of reflection

Dewey (1933, p. 9) defined reflection as "the active, persistent and careful consideration of any belief or supposed form of knowledge in the light of the grounds that support it and the further conclusion to which it tends". Reflection is mentioned by NSEE (1998) as one of key principles that transforms simple experience to a learning experience. Ash and Clayton (2004) have proposed three general perspectives of academic, personal, and civic reflection that maximizes learning. Furthermore, it is acknowledged that more critical reflection enhance students' ability to question assumptions and values in an authentic context (Davis, 2003; Mitchell, 2008).

To support both a concrete and an abstract development, mARC model suggests that *reflection should follow learning as essential step* (R1). Literature indicates that reflective thinking does not happen spontaneously, and that *reflection should almost always be explicitly encouraged* (R2). This can be *facilitated both in–action and on–action* (R3). To ensure that the learning environment can support learners to understand knowledge and experience, reflection can be guided *during both re– and de– contextualisation processes* (R4). Furthermore, it may be necessary to ensure that learners identify personal assumptions and question their meaning, as *reflection will not only challenge learning experience and developed knowledge, but its' influence reach beyond cognition* (R5). Finally, to strengthen authenticity and develop coherent knowledge, reflection *should be used as surplus tool for engaging with the complexity of a task* (R6) and *for developing a theoretical perspective from an authentic context* (R7).

7.3.3 Pillar of collaboration

The belief that knowledge is constructed through interaction with others is not new, but has gained more attention in educational research and practice (Lave & Wenger, 1991; Raes et al., 2014; Teräs, 2016). Collaborative learning refers to an instructional strategy in which learners work actively together in groups with shared aims (Johnson & Johnson, 2009). Such relationships among learners should be designed to initiate critical discussions in which students can explore personal opinions and different viewpoints on the topic addressed (Mitchell, 2008). Furthermore, collaboration and interactions between different parties (faculty, student, and professional or service community) can further support students' perceptions of authenticity. Ash and Clayton (2004) found that peer support during reflection on learning helped learners to be critical of their own experience, placing it in context, and expressing it concisely.

According to the mARC model, *students should be engaged within a community of practice in a cohort structure* (C1), where they would *witness different expertise as a resource for learning* (C2). Although learning in a group can be organized in various ways, *students' collaborative activities should be structured and guided* (C3) to support various learner processes and promote learning. Furthermore, it may be necessary to ensure that learners have opportunity to learn from each other's differences and *to see, share and express different points of view* (C4). Experiential learning tasks should involve individuals to work together to achieve common goals and to have *collectively shared performances or products* (C5). Furthermore, the model suggests that authenticity should be strengthened and socially constructed within *community of learners* (C6) *using the group members' experience when developing new understanding* (C7), and throughout *joint re–evaluation of experience and knowledge* (C8). Finally, learners should be encouraged to collaboratively reflect *using various perspectives they have* (C9). This can be achieved, for example, *by encouraging self–awareness within groups during the process of reflection* (C10) or *initiating debate on learners' conceptions and allowing peer feedback* (C11).

7.4 Research questions

To address how different pillars of experiential learning mutually influence and match each other, and how they impact learning outcomes, this chapter reports on our iterative design based research (DBR) using the mARC model for ID. The research was organised across three

empirical iterations to disclose the possibilities of using mARC to redesign experiential learning instructions within a master course for educational science students in higher education. The purpose of this chapter is not only to look for significant effects, but also to generate important practical insights for designing complex experiential learning instruction and rich learning experience (Reigeluth & Carr-Chellman, 2009; Young et al., 2008). The research was designed to answer the following questions:

RQ 1. How does the systematic change in the learning environment relate to students' academic performance?

RQ 2. How does the systematic change in the learning environment relate to students' motivation for learning?

RQ 3. How does the systematic change in the learning environment relate to students' perception of experiential learning and authenticity?

The remainder of the chapter is organized as follows. In the next section, we present the iterative DBR research approach we used to answer these research questions. After presenting the context of three studies, and after synthesizing the research results on experiential instructions, we conclude with a discussion of the three pillars for experiential learning. Findings and guidelines are seen as important for educators who desire to support their learners in their efforts to both increase their knowledge and learn by practical experiences.

7.5 Research approach

As we were interested in exploring this complex educational problem by using various instructional perspectives, we chose a design based research (DBR) approach (Barab & Squire, 2004; Plomp, 2007; Anderson & Shattuck, 2012): "Design based research is grounded in the practical reality of the instructor, from the identification of significant educational problems to the iterative nature of the proposed solutions" (Reeves et al., 2005, pp. 107). In order to briefly explain the DBR process of this study, Table 7.1 gives an overview based on the generic model for design research (GMDR) of McKenney and Reeves (2012). During three research iterations, the master course we had under investigation was redesigned within an educational setting, by adding different variations of mARC elements (Figure 7.2). In each study, students were divided into control and experimental groups, and the results are based on comparison

against each other. Data were collected, analysed, and evaluated after each research stage, and the most optimal redesign was applied to the next course run in a cumulative approach (Barab & Squire, 2004). The course was given two times a year and different students thus were participating each time.

In the first research stage different levels of Authenticity were investigated. The findings of the first stage set the basic design for investigating the effects of the second pillar of Reflection. Hence, in the second research stage the most effective authentic environment is used to investigate different levels of Reflection. Finally, in the third research stage of this iterative approach, the most optimal levels of Authentic and Reflective environments were used to investigate the optimal level of Collaborative reflection for effective experiential learning, within the third pillar. Table 7.1 presents the most important dependent variables that were measured throughout the DBR stages and studies.

Table 7.1. *An outline of DBR based on McKenney and Reeves' (2012) generic model for design research (GMDR).*

	Study 1	**Study 2**	**Study 3**
Number of participants	*n* = 37	*n* = 84	*n* = 50
Duration of the experiment period	Feb - May 2019	Sept - Dec 2019	Feb - May 2020
Research focus of the experiment	Authenticity	Reflection	Collaboration
Measuring instruments			
Course academic report writing	x	x	x
Questionnaire	x	x	x
Students motivation*	x	x	x
Perception of authenticity**	x		
Perception of experiential learning***	x	x	x
Satisfaction with interactions****			x
Reflection assignment		x	x
Students asynchronous discussion posts			x

Note: * Intrinsic Motivation Inventory (IMI) instrument from Ryan and Deci (2000); ** 5D framework for authenticity (5DF) instrument from Gulikers et al. (2004); *** Perception of experiential learning (EXP) instrument from Young et al. (2008); **** instrument from Driver (2002) and Lucas (2003).

Design decisions were influenced by triangulation of both quantitative and qualitative research methods with respective statistical techniques (Anderson & Shattuck, 2012). Multiple data sources were used (Table 7.1): final academic report assessments (as measure of academic performance); students' written reflection assignment to discussion forum (as measure of the level of reflection); a post-test questionnaire with measures on motivation, perception of

authenticity, and experiential learning; and debriefing activities to get more qualitative insight in the learning process and opinions of participants.

Below, the context of the course and the most effective experimental environment within each of these three research iteration are briefly described to illustrate how experimental learning environment was redesigned according to the model presented in Figure 7.1. For the complete overview of these studies we refer to Radović et al. (2020) for Study 1, Radović et al. (2021a) for Study 2, and Radović et al. (2022) for Study 3.

7.5.1 Context of the course and three studies

DBR was situated in one course of a Master program for Educational Sciences at our university, and conducted during three consecutive semesters (see Table 7.1). This Master is offered as distance learning and targets professionals in education, mainly teachers who seek an academic degree, and want to combine work with study. The course under study introduces students into important learning theories, both by studying theory and by experiencing these theories at work in actual practice. The course starts with a face to face introduction and the remainder continues online. Students and teachers interact through discussion boards and regular synchronous meetings in the Virtual classroom (Collaborate software).

The course allows students to study literature (AE), conduct an observational study of a classroom learning situation (CE), analyse a classroom learning situation from the theoretical perspective and with the tools of an educational researcher (RO), and at the end to make generalizations from the concrete experiences through the lens of theory and methodology (AC) when writing an academic report. In their learning activities students follow the four steps of experiential learning cycle by Kolb (1984) to facilitate both processes of re- and de-contextualisation (Radović et al., 2020).

7.5.2 More authentic learning environment (study 1)

The first study aimed to find out how two different levels of authenticity (Less and More Authentic) in the course design correlate with students' learning outcomes. While the More Authentic course design offered students more freedom to choose a classroom learning situation to observe (task authenticity); high variability and availability of observation resources (physical context); and social interactions with a positive interdependence on the

members (social context), students in the Less Authentic course variation were offered a set of prepared documents, limited social context, and prearranged learning situation (all impede the level of authenticity). We will describe the More Authentic variant of the course, as it provided more benefits for students.

For a period of 11 weeks, the course guides students through complex observation assignment with series of learning tasks, while solving one complex assignment (A3). Students are gradually introduced to theoretical knowledge (for example, different learning theories) and professional skills (such as arranging observation or preparing interview) (A2, A4). Students are expected to: 1) demonstrate knowledge by constructing an analysis instrument that is based on their knowledge of learning theories) (A6); 2) use professional skills (using research instruments, analysing data, and presenting results); and 3) create relevant and significant products for presenting their findings (poster presentation and an academic essay) (A1). To successfully accomplish the task, students have multiple learning focuses (A5): by choosing the context for observation, by organising the observation, by making agreements with an educational institution, by preparing and objectively conducting the observation, by collecting and analysing data, and by reporting findings (A7). The course criteria, used to assess the academic reports, are similar for the evaluation of work in professional situations, like for a journal or conference paper review (A8).

7.5.3 More reflection learning environment (study 2)

The findings of the first study set the basis for the second experiment. Therefore, in the second study the most effective authentic environment (i.e., More Authenticity) is used to investigate the influence of different levels of Reflection (Less and More), and to understand how this support experiential learning. While students in the Less Reflection design were prompted toward providing evidence on understanding concepts and theory, or describing issues arising from concrete experience (Habitual actions and Understanding); students in the More Reflection course design were prompted to use practical context to think about theory (and vice versa) and to consider personal beliefs to have direct influence on learning activity (Reflection and Critical reflection). The More Reflection design, as described below, facilitated students' deeper learning.

Five reflection tasks (R2) were designed to explicitly prompt students to: 1) re-capitalise on the relevant learning theme; 2) write an (three hundred words) answer to the respective

reflection prompt; and 3) share their writing with their peers, by using the discussion forum after each study task. This reflection tasks were organised to follow the learning activities 1) at the time students acquire learning experience (Reflection–in–action), or when 2) students need to examine experience using theoretical knowledge or professional skills (Reflection–on–action)(R3). Students were asked to reflect on choosing the context for observation, organising the observation, preparing and objectively conducting the observation, collecting and analysing data, and reporting findings concepts and practical experiences (R1). To bridge the gap between theory and experience, students were prompted to re-contextualize theoretical knowledge in relation to practical situations, but also to find concrete arguments to de-contextualize their understanding (R4). Finally, to strengthen authenticity and develop coherent knowledge, students were guided to bear with complexity of authentic context by focusing their thinking on the concreate experience that need their attention and further analysis (R7, R6).

7.5.4 More collaborative learning environment (study 3)

In the third and last study of our cumulative DBR approach, the findings of the first two experimental studies had set the basic design. Therefore, in the third study the most effective Authenticity and Reflection levels were used to study the influence of adding different levels of Collaborative Reflection elements.

Students were prompted not just to reflect and share their reflection, but also to discuss their reflections and different insights within a cohort (C1). Since each of the reflection tasks followed specific learning assignments, students were discussing different perspectives and different points of view on their concrete learning experiences (C2). This was done online, on the web platform that allowed students to communicate and discuss in a forum style. Discussions were led in threads that accompanied reflection assignments. Students were urged to act with openness and trust, and stimulated to engage within the learning community (C9). They were asked to give compliments, provide assistance, highlight concerns, and suggest additional courses of action (C3). Following the model, collaborative activities were used to socially construct and strengthen authenticity (eg. collaboratively reflect on an authentic experience) (C7), but also to support reflection processes (eg. questioning personal assumptions when considering multiple perspectives) (C8). Students had various opportunity to witness each other's differences, to see, share and express different points of view (C4), and to discuss collectively shared understanding (C5).

7.6 Overall results

The results of the data analysis along the way directed the cumulative design of sequential experiential learning environments, as described in the previous sections, for the course under study. We used various measuring instruments (see Table 7.1) to analyse the effects of each design iteration on students' achievement, their motivation, and their perception of experiential learning and authenticity. In Table 7.2 we summarize the statistical significant results for each outcome variable. As non-parametric tests were run in the separate studies, we do not report effect sizes in this article, but *p* values of the Mann-Whitney and Kruskal-Wallis statistics obtained. Results will be briefly described, and significant results will be related to the research questions, in order to illustrate how the systematic redesign of the learning environment has influenced learning, as can be observed from increased scores on the output variables (as mentioned in Table 7.2). For the complete overview of results we refer to Radović et al. (2020) for Study 1, Radović et al. (2021a) for Study 2, and Radović et al. (2022) for Study 3.

Table 7.2. Overall results.

Variables	**Study 1**	**Study 2**	**Study 3**
Quality of academic performance	n.s.	$p = .039$	n.s.
Quality of reflection	*	$p < .001$	$p = .038$
Perception of motivation	(high) n.s.	(high) n.s.	(high) n.s.
Perception of quality of experiential learning	$p = .081$	(high) n.s.	(high) n.s.
Perception of authenticity	$p = .016$	/	/

Note: * - does not apply here; / - not measured; high – ceiling effect as a results of high ratings; n.s. – comparison between groups not significant.

7.6.1 Quality of academic performance

Effects on academic performance are measured through assessment of students' final course assignment (writing an academic report). Course criteria assess the extent to which students apply theory to practice, and the extent to which they extract and report theoretically relevant meanings from a practical situation.

Statistical analysis revealed no significant effect of the different levels of authenticity on the academic performance, although participants in More Authentic group have a tendency to score higher on all course criteria. When adding instructional elements of reflection in the second study, students in More Reflection variation of the course outperformed other students ($p = .039$). On subscale level of academic performance, a marginal statistical difference ($p = .091$)

was evident on their quality of scientific reporting (quality of the introduction, general theoretical framework, methods, results, conclusion and discussion sections). On the quality of the content criteria for academic performance, students in the More Reflection condition described practice better, demonstrated theoretical knowledge better, and were more successful in analysing this practice through a theoretical lens ($p = .032$).

Finally, regarding the third study and the contribution of a More Collaborative Reflection environment, no significant differences were observed on Academic performance. However, an analysis of demographic characteristics suggest that More Collaborative Reflection settings support shared understanding, and proved to be of equal benefit to all students. This finding was in contrast with the previous two studies that found older students, as well as students with more work experience and those students coming from research universities, to obtain better academic performance scores than younger students that were less experienced, and came from higher vocational education.

7.6.2 Quality of reflection

Finally, the benefits from the More Reflection condition were manifested by students achieving higher Quality of reflection ($p < .001$). The second study revealed that More Reflection prompted students to reach the level of critical reflection. Regarding the third study and the impact of a More Collaborative Reflection environment an important contribution from the Collaboration pillar could be mentioned. Students were able to achieve higher levels of reflection ($p = .038$). Discussions triggered reflection and higher order thinking, and helped students make their thoughts explicit in a social context.

7.6.3 Students' motivation

With regard to the students' motivation, measured by the Intrinsic Motivation Inventory (IMI) instrument (Ryan & Deci, 2000), the results of the correlation analysis indicate a positive relationship between the dimensions of motivation (perceived interest and value), and the perceptions of authenticity and of experiential learning. The overall perceptions of motivation, authenticity and experiential learning were dependent on each other, interlinked rather than discrete and disconnected. Additionally, more complex learning instructions including reflection in the second study and collaboration in third study did not lead to decrease of

students' motivation, perception of usefulness, interest and enjoyment during learning. Each subscale of the questionnaire was almost equally and highly rated in all three studies.

7.6.4 Perception of the quality of experiential learning

The third research question focused on the effect of DBR on the quality of experiential learning. In all three studies we used questionnaire from Young et al. (2008) with four dimensions that estimate learners' awareness of Active Experimentation (AE) and Concrete Experience (CE), as two steps of Re-Contextualisation; as well as Reflective Observation (RO) and Abstract Conceptualization (AC), as two steps of De-Contextualisation.

The first study demonstrated a tendency for students in More Authenticity to perceive their learning environment as more experiential (p = .081). More Authenticity in the learning environment had students rate the re-contextualisation process statistically significantly higher than students receiving Less Authenticity (p = .033). We could observe that: 1) new learning experiences or professional situations were encountered (CE); and 2) experimenting with course concept and theories was done in order to improve understanding (AE). On the other hand, there was no effect on the de-contextualisation process of experiential learning.

The analysis of the second and the third research study revealed that students perceived all four steps of experiential learning (CE, RO, AC, and AE) as equally important (that is with equally high scores), without significant differences between the groups. Although prompting reflection positively influenced students' learning results and academic performance, it did not influence the (already high) rating of experiential learning. Similar results were found in the third study.

7.6.5 Perception of authenticity

Finally, we examined students' perceptions of their possibilities to apply knowledge in the context of the (future) work environment by using professional skills and tools. Gulikers et al.'s (2004) 5D framework was used to measure their perception of authenticity. During the first study, students in More Authentic environment agreed on the relevance of authenticity, and clearly valued the contextualisation of learning in a context that mirrors professional work. Perception of overall authenticity was significantly higher in the More Authentic group (p = .016), when compared to the Less Authentic group. Students were able to perceive various

opportunities to make a connection between knowledge and practical experience when they used professional tools, knowledge and skills, and when they imitated behaviour of experts.

7.7 Discussion

The purpose of this study was to share some overall insights on how practitioners may systematically redesign and conceptualize more experiential learning environments within their higher (online) education. The mARC model described in this article provides a useful framework to guide the design of learning environments to support learners in their effort to create knowledge through practical experience. This article further evaluates the overall suitability of the model and the evidence from three underlying studies. Based on that model and our empirical findings, we first present relevant conclusions for the three pillars of experiential learning, followed by some practical implications (Table 7.3).

The first study showed that instructional authenticity elements better relate concrete learning experiences with knowledge development, and provide several other benefits for learning. They cater for students learning to use professional tools, knowledge and skills when engaging into all four steps of experiential learning (and facilitated both re- and de- contextualization of knowledge). Furthermore, the perceptions of authenticity, motivation and experiential learning were appeared to be related. These results are in line with Herrington et al. (2010, p.19) who acknowledged that an authentic context provides "the purpose and motivation for learning, and a sustained and complex learning environment that can be explored at length". However, although learning activities allowed the experience to be generalized to other (different) situations, it did not influence students' academic performance. These findings deepen our understanding of how authentic learning can be enhanced (and supplemented) to achieve more learning benefits.

The second study revealed that using instructional reflection elements improves the academic learning outcomes. These findings are in line with earlier conclusion of Coulson and Harvey (2013) who found that reflective practice incorporated into curriculum together with authentic learning enables students to reach a better understanding when learning through experience. In the work of Davis (2003), such prompts were seen to promote the knowledge integration process of identifying weaknesses in learner's knowledge. Results presented in our study reveal that more reflection prompts can support students to develop academic ways of thinking, to further generalise their experience, and to achieve better academic results. It should be noted

that reflection can be used for engaging students with the complexity of authentic tasks and for developing a theoretical perspective from an authentic context. These two important features of more reflection environments strengthen students' perception of authenticity and gave them more opportunities to examine personal believes of practical experience to construct theoretical concepts.

Third, the final study found the third pillar of the mARC model to have a positive impact on various aspects of the learning process. It enhanced individual reflection and interaction between peers. It also promoted collaborative knowledge construction in a way that led (less experienced and younger) students to use the group members' experiences to form new understanding and share reflective thinking (Radović et al., 2022). The similar conclusion are reviled in Raes et al. (2014) study, who found that sharing and discussing ideas about authentic learning material in small groups gives all students the opportunity to express their thoughts, while specially supports low-achieving science students. In our study this was achieved within a cohort structure, where students also witnessed different expertise as resource for learning and understanding. According to Lindsey and Berger (2009) and Coulson and Harvey (2013), instead of simplifying the design, learners should be provided with appropriate social and collaborative contexts helping them to deal with the complexity of knowledge construction complexity rather than to avoid it. Our study showed that sharing and discussing reflective thinking with peers in a collaborative setting promoted more critical thinking and improved students' levels of reflection.

Two limitations of this study should be taken into account. First, the basic settings of DBR (using the same course over all three iterations of the research, assuring a cumulative research approach) limited the selection of participants. To maintain the same context we were not able to include students from other courses or other faculties (Plomp, 2007). Second, as being situated in a real educational environment, during formal educational process, our research design process had to comply with various policies and principles that have been developed to maintain the educational quality (Anderson & Shattuck, 2012). For example, constrained by the educational vision, rules of examination and ethical issues of our university, we were *not* in a position to include more experimental variety in conditions, by: 1) making even greater difference between two authentic environments, 2) making reflective assignments compulsory as part of students' assessment, and 3) placing students in smaller groups with collectively worked out products.

7.8 Implication for theory and practice.

It is evident that all three pillars of mARC model were important to redesign rich and complex experiential learning environment. The question remains if the same research results would be reached with just one more complex stage of development? We believe that this cumulative approach would be possible, since the links between fostering and strengthening elements within the model are clearly highlighted (see Figure 7.2, and explanations in Section 4). Even more importantly, the mARC model is supposed to be used during a three–step DBR process, however this does not mean that after three cycles of iteration mARC model loses its applicability. To facilitate the pursuit of more experiential learning, it is probably necessary to research the model with applying more cyclical iterations (Anderson & Shattuck, 2012). Finally, while we found that higher levels of the main instructional elements improve experiential learning, an important point for researchers using the mARC model is to find the optimal complexity of these instructional elements. That is, a balance should be found between maximizing learning outcomes without creating an overwhelming (and costly) learning activity that could paralyze learners' knowledge growth (Radović, 2021f).

Taken altogether, the findings of this study suggest that mARC model provides a useful framework to guide the design of learning environments to support learners in their effort to create knowledge through practical experience. The following five suggestions are intended to help practitioners successfully facilitate more experiential learning. First, students should be supported to interact with the environment in an authentic way and through authentic activities. Second, students should be able to practice theory and theorize practice, alternating often between the two. Third, ensure that students have the opportunity to experience the learning problem from a number of perspectives. Fourth, use explicit and clear reflection prompts to allow students to examine their beliefs, understandings, and knowledge. Consider encouraging students to continually share and discuss their reflections. Finally, enable students to develop understanding and critical attitudes toward each other's contributions and ideas. These five general characteristics are presented in Table 7.3, where they are complemented by more specific practical guidelines for designing learning processes, concrete examples from our study, and related to mARC ID elements.

Table 7.3. Practical guidelines for a course featuring more experiential learning.

Characteristics	Practical guidelines for design	mARC ID elements
Support learners in interacting with the environment	IF you provide a realistic learning context THEN the physical environment should reflect the full context in which knowledge and skills have to be used. *Example: In the course under study, students observed the full physical context of a classroom instruction, and analysed the instruction provided on all theoretical characteristics.*	A1, A5, R5.
	IF you provide a realistic activities THEN student should mimic experts when using knowledge and professional skills. *Example: In the course under study, students acted as a researchers when they organised and prepared the observation, collected data, and analysed and reported results in relation to main learning theories.*	A2, C6.
Promote relationship between theoretical concepts and practice	IF you use a realistic learning context THEN the learning activities should be challenging and complex, yet manageable. *Example: In the course under study, the learning environment included several activities to promote student engagement with a real classroom observation.*	A4, A8, R6, R3, C7.
	IF you use a complex learning task THEN allow sustained periods of time for students to understand the authentic context. *Example: In the course under study, students were engaged with the observation task during the entire course.*	A3, A8.
	IF you encourage the de-contextualization of knowledge THEN students should recognise situations in the practical context in which they can generalize experiences into new knowledge. *Example: In the course under study, students developed a theoretical framework (based on literature), which was then used as research tool for the observation.*	R7, R4, C11.
	IF you promote relations between theoretical concepts and practice THEN students should use concrete practical situations to develop knowledge. *Example: In the course under study, students used real classroom situations to analyse and develop knowledge about main learning theories.*	R1, R4.
Introduce different perspectives to students	IF you provide various learning opportunities THEN students must have the opportunity to experience the learning problem from a number of viewpoints. *Example: In the course under study, students consulted literature, participated in the classroom situations, interviewed school teachers, and had access to the various school policy documents.*	A2, A4, C9, C4.
	IF you provide different learning sources THEN you should include both relevant and irrelevant information.	A4, R6, C2.

Characteristics	Practical guidelines for design	mARC ID elements
	Example: In the course under study, students had to inspect various learning resources: theoretical articles, video materials, and various school policy documents.	
	IF students are learning in a group THEN organise conditions for students to compare themselves to others. *Example: In the course under study, reflection tasks after each learning milestone were used for students to share their understanding with peers and compare their thinking with others.*	C11, C2.
Support students in examining their beliefs and understanding	IF you provide a learning environment that promotes reflection THEN students' reflection should be guided with explicit and clear prompts. *Example: In the course under study, reflection tasks followed each learning milestone to direct students to examine their beliefs and understanding.*	A8, R1, R2.
	IF you embody reflection as an element of authentic context THEN reflection must be aligned with the curriculum and potential learning pitfalls. *Example: In the course under study, reflection tasks were used to help students complete a learning milestone, prepare for the next challenge, and focus their cognitive activity on both possible mistakes and learning opportunities.*	A2, A7, R6.
	IF you want students to structure their reflection thinking THEN introduce journal writing activities to students. *Example: In the course under study, students wrote forum posts in response to reflection prompt. This can also be done through notebooks, reflection diaries, or personal blogs.*	A7, R5.
	IF you provide collaborative knowledge construction THEN situate the reflection within a group of learners. *Example: In the course under study, the social context of reflection was facilitated by discussing and providing feedback on shared reflection notes amongst peers.*	C3, C4, C11.
Enable collaborative development of understanding	IF you provide for collaborative development of understanding THEN organize students to share their individual perspectives within the group. *Example: The course under study facilitated cohort discussions within the forum, where students could seek peer feedback and additional help at various stages of learning.*	C3, C6, C9, C11.
	IF you promote awareness of different personal assumptions during learning THEN support students in sharing their reflective writing with the cohort. *Example: In the course under study, students shared their personal reflection notes. Students were also encouraged to read the writings of others.*	A7, R5, C10, C2, C4.

Characteristics	Practical guidelines for design	mARC ID elements
	IF students participate in collaborative learning THEN support them to develop jointly products or solve problems together. *Example: In the course under study, students were required to collaborate in developing a theoretical framework to be used in all individual cases.*	A8, C5.

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Appendices

Appendix A. The questions for debriefing session

1. Looking back at the task that was central to this course, how can you characterize the task - when answering, you can indicate to what extent the task was (or not) interesting, instructive, fun to do and why.

2. Could you use your experiences to better understand (learning) theory concepts in performing this task - explain your answer!

3. Did you have sufficient opportunity during the course to reflect on learning about the task you were performing?

4. Did working with your fellow students help you learn in this course? What did you find positive and less positive about this collaboration.

Appendix B. Details on the alignment of course design and eight principles for authenticity of mARC to facilitate both processes of re- and de- contextualization within experiential learning.

mARC principles	Operationalised in the course design
1. Develop task with a high interdependence between theoretical inquiry and concrete learning experiences (reflecting the complexity of professional situations)	The main task in the course facilitates learning experiences at a deeper level of reasoning by making the dependency between theoretical knowledge and practical learning experience (both in LA and MA). Students are expected to 1) study literature on educational theories, 2) conduct an observational study (in LA based on a video recording of learning situation; while in MA based on a real classroom learning situation), 3) analyse a classroom learning situation from the theoretical perspective and with the tools of an educational researcher, and at the end of the course 4) make generalizations from the concrete experiences through the lens of theory and methodology when writing a scientific essay.
2. Make opportunities for students to demonstrate skills and knowledge by creating a significant product and creating understanding	By carrying out an observation study, both students in LA and MA are expected to apply learning theories and principles at micro level (in the classroom) and at meso level (curriculum design). Learning is embedded in a context that reflects the complexity of research (less authentic in LA, and more authentic in MA), to provide students with sufficient opportunities to 1) demonstrate knowledge (building research instrument based on knowledge of learning theories); 2) use professional skills (using research instruments during observation, interviewing and collecting documents (only in MA), analysing data, and presenting results), and 3) create relevant and significant learning products (poster for public presentation and an academic essay).
3. Provide a sustained period of time for finishing task	For the period of 11 weeks, students are guided, throughout the series of learning milestones, to solve one complex task (doing an observation study). With different learning activities in each of the learning milestones, students are gradually introduced to theoretical knowledge and professional tools that are seamlessly integrated into the complexity of the overall task.
4. Facilitate that students see the variability of experiential learning activities without rigidness of the fixed learning patterns	The course enables and encourages students to carry out an observation study, in which they mimic the work of researchers. The main task is ill-defined, from students is expected to outline the subtasks (decide research questions, produce research plan, chose education situation (only in MA), organise observation (only in MA), collect data, analyse data, prepare presentation, and write academic essay); and, only in MA, to plan additional activities such as: making agreements with an educational institution, prepare and objectively conduct observation. Students may use various resources to support

mARC principles	Operationalised in the course design
	their observation from a number of different viewpoints (although the set of documents is limited in LA).
5. Task should elicit higher order thinking and stimulate a wide range of cognitive strategies (including elaboration, analysis, organisation or deduction)	To successfully accomplish the task, students need to use higher order thinking skills like elaboration, analysis, organisation and deduction. This is echoed in various learning activities, such as: 1) formulating research questions (significant from both a theoretical and a practical viewpoint); 2) longitudinal focus on the research question; 3) organising observation (only in MA); 4) developing assumptions, analysing data and constructing conclusions in respect to the research questions; 5) formulating conclusions for an academic essay; and finally 6) presenting arguments and discussing result during poster presentation.
6. Task should include shared work and collaboration activities with peers and community of practice, to mimic activities of experts and professionals	The course starts with a face to face introduction of students and teachers, and continues online. Students work individually or in groups using an online web platform. Students are encouraged to work together to design their theoretical framework in order to analyses data. Another collaborative activity, online poster presentation, gives students the opportunity to share research results, express different points of view, and learn from discussion. Next, a written report is done individually. Only in MA, the task also includes a professional context of a researcher to mimic social activities when making arrangements and collaborating with the teacher and relevant others from an educational institution where their observation is planned.
7. Theoretical knowledge should be used as a tool to understand a concrete learning experience (re-contextualisation)	The task requires students to design and develop an analytical framework to understand a classroom situation. The analytical framework is built upon the understanding of learning theories and requires the transfer of theoretical knowledge in the process of design. In addition, the assessment of the students is also determined by the extent and degree to which this analytical framework is used in practice.
8. Students should be engaged in generalisation processes in order to associate meaning from experience with a broader context of knowledge (de-contextualisation)	The task involves students in the process of abstract conceptualisation. As a results, students develop and advance their theoretical knowledge (knowledge of concepts, facts, and learning theories) when 1) explaining their research results, and 2) drawing conclusions through reflective consideration of results. Furthermore students are supported to generalising various results during poster presentation session, and to construct knowledge based on results and ideas of others.

Note: LA = Less Authentic environment; MA = More Authentic environment.

Appendix C. The phases of social knowledge construction for collaborative reflection illustrated in the scaffolds for the fifth reflection assignment.

Phases of collaborative reflection	**Reflection assignments**	
	Scaffold for SSR group	**Scaffold for SDR group**
Phase 1: Reflection.	Finalize study task 5 with a short reflection writing on the poster walk and the results for you as a researcher. What new insights have this posterwalk, the presentations, and conversations yielded? What conclusions can you draw from your own research and the research of others on the basis of these new insights? Mention a few concrete points.	Finalize study task 5 with a short reflection writing on the poster walk and the results for you as a researcher. What new insights have this posterwalk, the presentations, and conversations yielded? What conclusions can you draw from your own research and the research of others on the basis of these new insights? Mention a few concrete points.
Phase 2: Sharing individual reflections.	Based on your answers, write a short piece of 200-300 words and share this piece in the discussion.	Based on your answers, write a short piece of 200-300 words and share this piece in the discussion.
Phase 3: Being aware of different ideas.	Read writings from fellow students.	Read writings from fellow students.
Phase 4: Discussing Reflection	/	Are there any points you would like to discuss with your peers? Do you agree with different perspectives raised by others?
Phase 5: Exploring new course of action	/	What are the differences in the perceptions and reflections of the poster walk? Are there conclusions that may now have become clearer or conclusions that can be adjusted on the basis of everything you heard and discussed?

Note: SSR – Socially Shared Reflection, SDR – Socially Discussed Reflection

Appendix D. Questions for debriefing session.

1. Have you read the posts of others before posting your finalization? How many messages did you read before you posted your elaboration? Can you explain your approach to rounding orders?

2. Have you commented on the posts for Completion of other students? Can you explain which messages you responded to, why exactly these?

3. Were the instructions for reading and commenting on other students' messages clear enough? Could you explain your answer?

4. Looking back at the task that was central to this course, how can you characterize the task?

5. Could you connect knowledge and experience in performing this task?

6. Did you have sufficient opportunity in the course to reflect on learning the task you performed?

7. Please think along! What can we do to involve the students more in commenting on different ideas and perspectives that are discussed within the reflection assignments?

Appendix E. Coding scheme used to describe posts in asynchronous discussions.

Categories	Code	Description	Example of students posts from discussions
Contributing	HEG	Help giving: Responding to questions and requests from others.	Hi Student 16, regarding your question - I received feedback from Teacher on my proposal, that I was not allowed to name students and that the only participant was the teacher. Regards, Student 13
	FBG	Feedback giving: Providing feedback on proposals from others.	Hi Student 2, Nice structure! Perhaps it is useful to not only do didactic acting at the beginning, but also to put the word instruction, since didactic acting is much broader. Sincerely, Student 27
	ERI	Exchanging resources and information to assist other group members.	Hi Student 21, Regarding your last question: I think Methods and Statistics (Youlearn) has an APA sample report as a template. This contains all tips and comments. If I can find the template, I will attach it.
	SKN	Sharing knowledge: Sharing existing knowledge and information with others.	I thought I read the following about a hidden curriculum: “Hidden curriculum means that, for example, a teacher can also give something extra to students outside of the existing curriculum. Do you have a certain hobby, or do you adhere to a certain faith, then you will 'pass it on' to pass on things to your students. However, these aspects are not mentioned in a curriculum.”
	CHS	Challenging others: Challenging the contributions of other members and seeking to engage in debate.	Hello Student 1, After reading your explanation, I am curious if there are any other pitfalls than the pitfall as described with regard to the observation. Student 12
	EXE	Explaining or elaborating: Supporting one's own position (possibly following a challenge).	Hi Student 12, Thank you for reading. Certainly there are pitfalls! I can overlook things, events can go too fast. Then it comes down to making choices. That is why the viewing objective is so important; the instruction. Maybe you have tips? Student 1
Seeking Input	HES	Help seeking: Seeking assistance from others.	Hello Student 16, I would like to take advantage of your offer! :) I like writing and I also like to get better at it. My sentences are sometimes still too passive (and therefore too long). I am now a bit unsure about the structure and connection?
	SFB	Feedback seeking: Seeking feedback to a position advanced.	I thought a learning principle is the way of learning as defined by the overhanging learning theory? It this ok?
	AEF	Advocating effort: Urging others to contribute to the group effort.	Also, to learn more about education myself, I would like to read some pieces from others!

Social Interaction	Social interaction: Conversation about social matters that are unrelated to the group task.	Hi Student 27, Thank you for your tip! Greetings, Student 2
Monitoring	Monitoring group effort: Comments about the group's processes and achievements.	No examples - interaction not identified in the text.
Planning	Organizing work: Planning group work; setting shared tasks and deadlines.	No examples - interaction not identified in the text.

Summary

Summary

There has been a growing interest in how higher education can provide students with a meaningful bridge between knowledge and experience during their formal learning process. Research and theoretical initiatives show that the integration of theoretical and practical knowledge is possible, but a complex instructional endeavour. In such an experiential learning approach, students get the opportunity to apply knowledge to new experiences (contextualizing knowledge); at the same time, new knowledge can arise from gaining concrete learning experiences and become converted into abstract generalizations (de–contextualising knowledge); but also from applying this new generic knowledge in other learning experiences (re–contextualizing knowledge).

However, teachers in higher education face many challenges in their attempt to support students in re– and de– contextualizing their knowledge. The complexity of designing such experiential learning, together with relevant criticisms are often emphasised. First, higher education institutions are criticized for failing to embrace comprehensive experiential learning instruction, leaving students with an overly simplistic relationship between experience and knowledge. Second, educators and teachers have limited knowledge of design-based processes to develop experiential learning instruction that provides students with a multifaceted experience. Also, they often miss the potential to deepen instructional design, instruction, assessment, and learning context to further facilitate experiential learning. Finally, it is claimed that any instructional gap in learning design reduces educational opportunities and, consequently, learning benefits.

The purpose of this research project was to address shortcomings from previous research on experiential leaning, by conceptualizing and evaluating an instructional design model that facilitates more experiential learning environments. We conducted theoretically and empirically informed studies to answer the key questions underlying this dissertation: (1) What instructional elements are relevant to experiential learning in higher education, (2) How can the experiential learning environment be systematically developed and redesigned, (3) What are effects of redesigning courses to include more experiential learning on students' academic performance, motivation for learning, and perceptions of experiential learning?

This dissertation consists of seven chapters. Chapter 2 describes a systematic literature study attempting to isolate and explore instructional elements that are relevant for experiential

learning in higher education. While learning itself cannot be designed, elements (instructional element) of the situation in which learning occurs can be purposefully designed to facilitate learning. This chapter addresses the questions of how learning environment can be conceptualized based on four perspectives. First, the results of this study suggest that the experiential learning can be effectively facilitated by the three pillars of experiential learning: a) learning is a cyclic process related to the "real" world beyond the classroom that mimics the complexity and limitations of professional work (Authenticity); b) learners are supported to construct meaning and critically reflect on dialectic relationship between knowledge and experience (Reflection); and c) learning is situated and mediated in a social context and community of practice (Collaboration). Second, we elaborated on the way in which students engage with the learning environment or peers, and the learning activities embedded in Authenticity, Reflection, and Collaboration. From literature review it also appears that effective experiential learning is challenging to organize. We distinguished facilitating and hindering factors within three categories (Student, Teaching and Learning Environment and Mediating), each with factors proven to have an impact on the learning processes and learning outcomes. Finally, an overview is given of distinguished positive and negative consequences of experiential learning (encompassing different aspects of knowing, conceptual understanding, discipline-specific and generic skills, and the range of values as a result of learning)

Chapter 3 provides more insight into the process of how experiential learning environments could be redesigned. The point of departure for this chapter was defined by the results from the review study and theoretical concepts of authenticity, reflection, and collaboration. The goal of this theoretical endeavor was to produce the instructional design model to serve both as a conceptual tool providing scholars with an understanding of interrelated instructional elements proven to facilitate experiential learning, and as a procedural tool that guides educators while designing and revising learning environments. Therefore, this chapter presents and discusses the mARC (more Authentic, Reflective and Collaborative), a three–components instruction model with a set of instructional elements proven to strengthen the ties between theory (abstract knowledge) and practice (concrete experience). Finally, the chapter ends with practical design-based guidelines for using the mARC model to design an effective experiential learning environment.

The empirical studies are presented in chapters 4, 5, and 6. These studies examined whether the (three) hypothesized pillars of the mARC mutually influence and build on each other, and how they impact students' learning outcomes. Chapter 4 provides empirical evidence on how different implementations of the authenticity pillar of mARC in the course design can be used to support students' motivation, academic performance and facilitate both re- and de-contextualization of knowledge. In the experiment, we compared two learning environments in which authenticity was implemented differently (a less and a more authentic learning environment). The More Authentic course design offered students: more freedom to choose a classroom learning situation to observe (task authenticity); high variability and availability of observation resources (physical context); and social interactions with a positive interdependence on the members (social context). Students in the Less Authentic course variation were offered: a set of prepared documents; limited social context; and a prearranged learning situation. The research reported in this chapter considered all the "pearls and perils" of authenticity and implied that more authenticity (1) gave students more practical experience to help construct theoretical concepts and involved them in testing ideas and experimenting with the course concepts. Finally, increases of students' perception of authenticity were positively correlated with increases of their motivation during learning.

In chapter 5, the most effective authentic environment (i.e., More Authenticity) was used to further build and investigate the influence of three different levels of Reflection (No reflection, Less Reflection and More Reflection), and to understand how this supports experiential learning, motivation and academic performance. Students in the Less Reflection design were prompted toward providing evidence on understanding concepts and theory, or describing issues arising from concrete experience (Habitual actions and Understanding). Students in the More Reflection course were prompted to use practical context to think about theory (and vice versa), and to consider personal beliefs to have direct influence on learning activity (Reflection and Critical reflection). This study showed that prompting critical reflection leads to higher level of reflection and better performance measured through academic writing. With respect to reflection as a complex cognitive process, the study demonstrated that systematically prompting reflection writing did not decrease students' perceived motivation, or their perceptions of usefulness, interest and enjoyment. Finally, the research results confirmed recommendations made in earlier theoretical work and revealed motives for encouraging prompted discussion and more collaborative reflection during learning.

Chapter 6 provides empirical evidence on how collaborative reflection in the course design can be used to support students' motivation, academic performance and facilitate both re- and de-contextualization of knowledge. In this third and final empirical study within the cumulative DBR approach, the findings of the first two experimental studies had set the basic design. The most effective Authenticity and Reflection levels were used to study the influence of adding collaborative reflection elements of mARC ID. In this chapter, we presented empirical evidence on how an asynchronous discussions support learners' collaborative reflection processes during experiential learning in higher education. The results of the empirical study showed that collaborative reflection enhanced individual reflection and interaction between peers. It also promoted collaborative knowledge construction in a way that led (less experienced and younger) students to use the group members' experiences to form new understanding and share reflective thinking. Moreover, learners had the opportunity to learn from each other's differences and to see, share and express different points of view. Finally, this study can be considered as a first step towards rethinking the way online and distance education can be organized to allow for collaborative reflection and to support students to become more critical and profound in constructing their knowledge during group discussions. In this way, reflective thinking could become a habit of the mind rather than only the superficial and obligatory part of course design. The implications of this research, such as the five phases for social knowledge construction based on the mARC model, are pointed to be used to strengthen the relationship between reflection and collaboration.

Chapter 7 gives a summary of main results and conclusions from all three empirical studies, and evaluates the overall suitability of mARC model. The results presented in this thesis underline that designing experiential learning environments in higher education is a complex and layered process. It is therefore important that educators and developers, have a framework to guide the design. Chapter 7 contributes further to this by sharing some practical guidelines on how practitioners may systematically redesign and conceptualize more experiential learning environments within their higher (online) education. To conclude the chapter, directions for future research are formulated.

Samenvatting

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Er is een groeiende belangstelling voor de vraag hoe het hoger onderwijs studenten een zinvolle brug kan bieden tussen kennis en ervaring tijdens het formele leerproces. Onderzoek en theoretische initiatieven tonen aan dat de integratie van theoretische en praktische kennis mogelijk is, maar een complexe instructieve inspanning is essentieel. In zo'n praktijkgerichte benadering krijgen studenten de kans om kennis toe te passen in de praktijk (contextualiseren van kennis). Tegelijkertijd kan nieuwe kennis ontstaan uit het opdoen van concrete leerervaringen en kan vervolgens de kennis omgezet worden in abstracte generalisaties (de-contextualiseren van kennis). Daarnaast kan men de nieuwe generieke kennis toepassen in andere context (re-contextualiseren van kennis).

Desalniettemin worden de leraren in het hoger onderwijs geconfronteerd met vele uitdagingen in hun poging om studenten te ondersteunen in het re- en de- de contextualiseren van hun kennis. De complexiteit van het ontwerpen van dergelijk onderwijsbenaderingen worden vaak benadrukt. Verder worden er meestal een aantal relevante kritieken geconstateerd. Ten eerste, hoger onderwijs instellingen hebben geen uitvoerige instructie voor het praktijkleren, waardoor de studenten een overdreven simplistische beeld krijgen van de relatie tussen praktijk en theorie. Ten tweede, leraren hebben beperkte kennis om processen voor de instructie van het praktijkleren te ontwikkelen, instructies die de studenten voorzien van de veelzijdige ervaring van het praktijk. Ook missen de docenten vaak het potentieel om het instructieontwerp, de instructie, de beoordeling, en de leercontext uit te werken om het praktijkleren verder te faciliteren. Tenslotte wordt er beweerd dat elk instructiehiaat in het leerontwerp de onderwijskansen kan verminderen en, als gevolg daarvan, de leerwinst beïnvloeden.

Het doel van dit onderzoeksproject was om tekortkomingen van eerder onderzoek naar praktijkleren aan te pakken, door een instructie-ontwerp-model te conceptualiseren en te evalueren waardoor praktijkgerichte leeromgevingen worden gefaciliteerd. Wij voerden theoretisch en empirisch gegronde studies uit om de belangrijkste vragen van dit proefschrift te beantwoorden: (1) Welke instructie-elementen zijn relevant voor het praktijkleren in het hoger onderwijs? (2) Hoe kan de omgeving van het praktijkleren systematisch worden ontwikkeld en her-ontworpen? (3) Wat zijn de gevolgen van het herontwerpen van cursussen,

waarbij er meer praktijkleren wordt opgenomen, op de academische prestaties, de motivatie voor het leren, en de percepties van de studenten in betrekking tot het praktijkleren?

Dit proefschrift bestaat uit zeven hoofdstukken. Hoofdstuk 2 beschrijft een systematische literatuurstudie om relevante instructie-elementen voor het praktijkleren in het hoger onderwijs te bepalen en te onderzoeken. Terwijl het leren zelf niet kan worden ontworpen, kunnen elementen (instructie-element) van de situatie waarin het leren plaatsvindt, doelgericht worden ontworpen om het leren te faciliteren. Dit hoofdstuk behandelt de vragen hoe de leeromgeving kan worden geconceptualiseerd, gebaseerd op vier perspectieven. Ten eerste, de resultaten van deze studie suggereren dat het praktijkleren effectief vergemakkelijkt kan worden middels de drie pijlers van het praktijkleren : a) het leren is een cyclisch proces met betrekking tot de "echte" wereld die zich buiten het klaslokaal bevindt en die de complexiteit en de beperkingen van professionele werk nabootst (Authenticiteit); b) de leerlingen worden gesteund om betekenis te construeren en kritisch na te denken over de dialectische relatie tussen kennis en praktijk (Reflectie); en c) het leren is gesitueerd en bemiddeld in een sociale context en de gemeenschap van het praktijk (Samenwerking). Ten tweede gingen we dieper in op de manier waarop leerlingen omgaan met de leeromgeving en hun medeleerlingen en op de leeractiviteiten die ingebed zijn in Authenticiteit, Reflectie en Samenwerking. Uit literatuuronderzoek blijkt ook dat het een uitdaging is om effectief praktijkleren te organiseren. Wij onderscheidden bevorderende en belemmerende factoren binnen drie categorieën (Student, Onderwijs- en Leeromgeving en Bemiddeling). Elke categorie heeft factoren waarvan bewezen is dat zij een invloed hebben op de leerprocessen en de leerresultaten. Tenslotte wordt een overzicht gegeven van de positieve en negatieve gevolgen van het praktijkleren (inclusief de verschillende aspecten van kennis, conceptueel begrip, discipline-specifieke en generieke vaardigheden, en de verschillende waardes als resultaat van het leren).

Hoofdstuk 3 geeft meer inzicht in het proces van hoe de omgeving van het praktijkleren kan worden her-ontworpen. Het uitgangspunt van dit hoofdstuk werd bepaald door de resultaten van de voorgaande overzichtsstudie, namelijk de drie theoretische concepten: authenticiteit, reflectie, en samenwerking. Het doel hiervan was om een instructieontwerp te produceren dat als een conceptueel hulpmiddel dient voor instructie ontwerpers. Dit ontwerp verheldert namelijk het verband tussen de instructieve elementen, waarvan bewezen is dat zij het praktijkleren faciliteren. Daarnaast biedt het een procedureel hulpmiddel dat leidt bij het ontwerpen en herzien van de leeromgevingen. Daarom presenteert en bespreekt dit hoofdstuk

mARC (more Authentic, Reflective and Collaborative), een drie-componenten instructiemodel die uit een reeks van instructie-elementen bestaat, waarvan bewezen is dat zij het verband tussen theorie (abstracte kennis) en praktijk (concrete ervaring) versterkt. Tenslotte eindigt het hoofdstuk met een aantal praktische ontwerp-gebaseerde richtlijnen voor het gebruik van het mARC model om een effectieve praktijkgerichte leeromgeving te ontwerpen.

De empirische studies worden weergegeven in de hoofdstukken 4, 5 en 6. In deze studies werd onderzocht of de (drie) hypotheses over de pijlers van mARC elkaar wederzijds beïnvloeden en op elkaar voortbouwen, en hoe mARC de leerresultaten van studenten beïnvloedt. Hoofdstuk 4 levert empirisch bewijs over hoe verschillende implementaties van de authenticiteitspijler van mARC in het cursusontwerp kunnen worden gebruikt om de motivatie en academische prestaties van studenten te ondersteunen en zowel re- als decontextualisatie van kennis te faciliteren. In het experiment vergeleken we twee leeromgevingen waarin authenticiteit verschillend werd geïmplementeerd (een minder en een meer authentieke leeromgeving). Het cursusontwerp met meer Authenticiteit bood studenten: meer vrijheid om een klassikale leersituatie te kiezen om te observeren (taakauthenticiteit); een hoge variabiliteit en beschikbaarheid van observatiemiddelen (fysieke context); en sociale interacties met een positieve onderlinge afhankelijkheid van de leden (sociale context). Studenten die de lagere authentieke cursusvariant kregen: een set voorbereidende documenten; beperkte sociale context; en een vooraf afgesproken leersituatie. Het onderzoek waarover in dit hoofdstuk wordt gerapporteerd, beschouwt alle "parels en gevaren" van authenticiteit en impliceerde dat meer authenticiteit studenten meer praktische ervaring geeft om theoretische concepten te kunnen construeren en hen betrekt bij het testen van ideeën en het experimenteren met de cursusconcepten. Ten slotte was een toename van de authenticiteitsperceptie van studenten positief gecorreleerd met een toename van hun motivatie tijdens het leren.

In Hoofdstuk 5 werd de meest effectieve authentieke omgeving (d.w.z. Meer Authenticiteit) gebruikt om de invloed van drie verschillende niveaus van Reflectie (Geen Reflectie, Minder Reflectie en Meer Reflectie) verder voort te bouwen en te onderzoeken. En om te begrijpen hoe de verschillende reflectie niveaus in deze context het praktijkleren, de motivatie en de academische prestaties ondersteunen. Studenten die de minder reflectieve ontwerp kregen, werden aangespoord om te laten zien hoe ze concepten en theorie begrijpen. Of ze werden aangespoord om problemen uit concrete ervaring te beschrijven (Habitual actions and Understanding). Studenten in de Meer Reflectie cursus werden aangemoedigd om de

praktische context te gebruiken tijdens het na denken over theorie (en vice versa) en om persoonlijke overtuigingen te beschouwen om direct invloed te kunnen hebben op leeractiviteit (Reflectie en Kritische reflectie). Deze studie toonde aan dat het aanzetten tot kritische reflectie leidt tot een hoger niveau van reflectie en betere prestaties gemeten door het academisch schrijven. Met betrekking tot reflectie als een complex cognitief proces, toonde het onderzoek aan dat het systematisch stimuleren van reflectie niet de waargenomen motivatie van de studenten verminderde, noch hun perceptie van nut, interesse en plezier. Tenslotte bevestigden de onderzoeksresultaten aanbevelingen uit eerder theoretisch werk en brachten motieven aan het licht voor het stimuleren van discussie en meer gezamenlijke reflectie tijdens het leren.

Hoofdstuk 6 levert empirisch bewijs over hoe collaboratieve reflectie in het cursusontwerp gebruikt kan worden om de motivatie en academische prestaties van studenten te ondersteunen en zowel re- als de-contextualisatie van kennis te faciliteren. In deze derde en laatste empirische studie binnen de cumulatieve DBR benadering, werd het basisontwerp bepaald aan de hand van de bevindingen van de eerste twee experimentele studies. De meest effectieve Authenticiteits- en Reflectieniveaus werden gebruikt om de invloed van het toevoegen van collaboratieve reflectie-elementen van mARC ID te bestuderen. In dit hoofdstuk presenteerden we empirisch bewijs over hoe asynchrone discussies de collaboratieve reflectieprocessen van studenten ondersteunen tijdens praktijkleren in het hoger onderwijs. De resultaten van de empirische studie toonden aan dat collaboratieve reflectie de individuele reflectie en interactie tussen de peers verbeterde. Het bevorderde ook collaboratieve kennisconstructie op een manier die de (minder ervaren en jongere) studenten ertoe bracht om de ervaringen van de groepsleden te gebruiken om nieuw begrip te vormen en reflectief denken te delen. Bovendien kregen de leerlingen de kans om te leren van elkaars verschillen en om verschillende standpunten te zien, te delen en uit te drukken. Ten slotte kan deze studie worden beschouwd als een eerste stap naar een heroverwogen wijze waarop online en afstandsonderwijs georganiseerd kan worden om collaboratieve reflectie mogelijk te maken en om studenten te ondersteunen bij het kritisch en diepgaand construeren van hun kennis tijdens groepsdiscussies. Op die manier zou reflectie een gewoonte kunnen worden in plaats van slechts een oppervlakkig en verplicht onderdeel van het cursusontwerp. De implicaties van dit onderzoek, zoals de vijf fasen voor sociale kennisconstructie gebaseerd op het mARC-model, worden gebruikt om de relatie tussen reflectie en samenwerking te versterken.

Hoofdstuk 7 geeft een samenvatting van de belangrijkste resultaten en conclusies van alle drie empirische studies en evalueert de algemene geschiktheid van het mARC model. De resultaten die in dit proefschrift worden gepresenteerd benadrukken dat het ontwerpen van praktijkgerichte leeromgevingen in het hoger onderwijs een complex en gelaagd proces is. Het is daarom belangrijk dat de ontwerpers van een dergelijke leeromgeving, een kader hebben voor het ontwerp. Hoofdstuk 7 geeft enkele praktische richtlijnen weer die de ontwerpers steunen bij het herontwerpen en conceptualiseren van systematisch en meer praktijkgerichte leeromgevingen binnen hun hoger (online) onderwijs. Ten slotte worden richtingen voor toekomstig onderzoek geformuleerd.

Резиме

Резиме

Све је веће интересовање за то како високо образовање може студентима пружити смислену везу између академског знања и пркатичног искуства током формалног процеса образовања. Истраживања и теоријске иницијативе показују да је интеграција теоријског и практичног знања могућ, али је уједно и сложен подухват. У таквом дуалном приступу учењу, ученици добијају прилику да примене знање на нова искуства (контекстуализовање знања); у исто време, нова знања могу настајати и генерализацијом различитих конкретних искустава из практичних примера (деконтекстуализовање знања); али и применом овог генерализованог знања у другим практичним ситуацијама (поновно контекстуализовање знања).

Међутим, наставници у високом образовању суочавају се са многим изазовима у покушају да омогуће студентентима контекстуализације и деконтекстуализације њиховог знања. Често се наглашава сложеност осмишљавања таквог дуалног образовања. Прво, високошколске установе се критикују због неуспеха у прихватању свеобухватног и комплексног дизајна наставног плана и програма, остављајући студентима превише поједностављен однос између практичног и академског знања. Друго, наставници имају ограничено знање о педагошким инструкцијама и дидактичким методама како би развили наставне програме које ученицима пружају свеобухватно образовно искуство. Коначно, сваки дидактички недостатак у дизајну наставе смањује образовне могућности и, сходно томе, користи од учења.

Сврха овог истраживачког пројекта била је да се отклоне недостаци из претходних истраживања о дуалном образовању (experiential laerning) коришћењем теоријског конципирања и практичног истраживања модела дизајна наставе који омогућава ефикасан и ефектан приступ дуалном образовању. Спровели смо теоретске и емпиријске студије како бисмо одговорили на кључна питања која леже у основи ове дисертације: (1) Који су наставни елементи релевантни за дуално образовање у високом образовању, (2) Како се дуално образовање може систематски развијати и редизајнирати, (3) Какви су ефекти редизајнирања курсева на академске перформансе ученика, мотивацију за учење и ставове о проецсу образовања?

Ова дисертација се састоји од седам поглавља. Поглавље 2 описује систематску студију литературе која покушава да изолује и истражи наставне и дидактичке елементе који су

релевантни за дуално учење у високом образовању. Иако се сам процес учења не може осмислити (јер се ради о когнитивним процесима који се дешавају у људском мозгу), елементи (наставни и дидактички) и ситуације у којима се учење дешава могу се са намером осмислити како би се процес учења подржао. Ово поглавље се бави питањима како се окружење за учење може конципирати на основу четири перспективе. Прво, резултати ове студије сугеришу да се искуство кроз учење може ефикасно олакшати помоћу три стуба дуалног учења: а) учење је циклични процес везан за „стварни“ свет изван учионице који опонаша сложеност и сва ограничења професионалног рада и окружења (**Аутентичност**); б) ученици се подржавају у конструисању значења и критичком промишљању о дијалектичком односа између знања и искуства (**Рефлексија**); и ц) учење је ситуирано и посредовано у друштвеном контексту и заједници коју чине ученици, наставници и различити професионалци (**Групно учење**). Друго, елаборирали смо начин на који се студенти ангажују и укључују у окружење за учење, као и педагошке и дидактичке активности учења кроз аутентичност, рефлексију и групно учење. Из прегледа литературе такође се чини да је учење кроз искуство изазовно организовати. Истакли смо олакшавајуће и ометајуће факторе у три категорије, од којих свака има факторе за које је доказано да утичу на процесе учења и исходе учења. На крају, дат је преглед позитивних и негативних последица дуалног образовања (обухватајући различите аспекте знања, концептуално разумевање, вештине специфичне за дисциплину и генеричке вештине).

Поглавље 3 пружа бољи увид у процес како се дуално образовање може редизајнирати и систематски развијати. Полазиште за ово поглавље дефинисано је резултатима прегледне студије и теоријским концептима аутентичности, рефлексије и групног учења. Циљ овог теоријског подухвата био је да се створи модел дизајна наставе који ће служити и као концептуални алат који пружа научницима разумевање међусобно повезаних наставних елемената за које је доказано да олакшавају дуално учење, и као процедурално средство које води наставнике приликом осмишљавања и ревизије окружења за учење. Стога у овом поглављу представљамо и расправљамо о mARC-у (више аутентичном, рефлексивном и групном), трокомпонентном моделу наставе са низом наставних елемената за које је доказано да јачају везе између теорије (апстрактног знања) и праксе (конкретног искуства). На крају, поглавље се завршава практичним смерницама заснованим на дизајну за коришћење mmARC модела за пројектовање ефикасног дуалног система за образовање.

Емпиријске студије представљене су у поглављима 4, 5 и 6. Ове студије су испитале да ли (три) хипотетичка стуба mARC-а међусобно утичу и надограђују се, те како утичу на исходе и процес учења. Поглавље 4 пружа емпиријске доказе о томе како се различите имплементације стуба аутентичности mARC-а у дизајну курса могу користити за мотивацију студената, академске перформансе и олакшану деконтекстуализацију знања. У експерименту смо упоредили два окружења за учење у којима је аутентичност различито имплементирана (мање и више аутентично окружење за учење). Дизајн више аутентичног курса понудио је студентима: већу слободу избора ситуације учења у учионици коју ће посматрати (аутентичност задатка); већу варијабилност и доступност извора посматрања (физички контекст); и друштвене интеракције са позитивном међузависношћу између члановима (друштвени контекст). Студентима у варијанти мање аутентичаног дизајна понуђено је: сет припремљених докумената; ограничен друштвени контекст; и унапред договорена ситуација учења. Истраживање објављено у овом поглављу разматрало је све „бисере и опасности“ аутентичности и имплицирало да је већа аутентичност дала студентима више практичног искуства у изградњи теоријских појмова и укључила их у тестирање идеја и експериментисање са концептима курса. Коначно, повећање перцепције аутентичности ученика позитивно је повезано са повећањем њихове мотивације током учења.

У Поглављу 5, ефикасније аутентично окружење (тј. већа аутентичност) коришћено је за даљу изградњу и истраживање утицаја три различита нивоа рефлексије (без рефлексије, мање рефлексије и више рефлексије). Студенти у дизајну Мање рефлексије били су подстакнути да пруже доказе о разумевању концепата и теорије, или да опишу питања која произлазе из конкретног искуства (Уобичајене радње и разумевање). Студенти на курсу Више рефлексије су користили практични контекст за размишљање о теорији (и обрнуто) и разматрали су личне ставове и разумевања о практичним догађајима и теоријским концептима (Рефлексија и критичко промишљање). Ова студија је показала да потицање критичке рефлексије доводи до већег нивоа рефлексије и бољег учинка мереног академским писањем. Што се тиче рефлексије као сложеног когнитивног процеса, студија је показала да систематско подстицање комплексијег процеса размишљање није смањило мотивацију ученика, нити њихову перцепцију корисности, интересовања и уживања. Коначно, резултати истраживања потврдили су препоруке дате у ранијим теоријским радовима и открили мотиве за подстицање подстакнуте дискусије и групног размишљања током учења.

Поглавље 6 пружа емпиријске доказе о томе како се заједничка рефлексија у дизајну предмета може користити за подршку мотивације студената, академске перформансе и олакшавање контекстуализацијје и деконтекстуализације знања. У овој, трећој и последњој, емпиријској студији у оквиру ове докторске тезе, налази из прве две експерименталне студије поставили су основни дизајн. Најефикаснији нивои аутентичности и рефлексије коришћени су за даље проучавање утицаја елемената групног учења дефинисаних mARC-ом. У овом поглављу представили смо емпиријске доказе о томе како асинхроне дискусије подржавају процесе групне рефлексије ученика током дуалног образовања. Резултати емпиријског истраживања показали су да колаборативна рефлексија побољшава индивидуалну рефлексију и интеракцију међу ученика. Такође је промовисала заједничку изградњу знања на начин који је (мање искусне и млађе) ученике навео да користе искуства осталих чланова групе за формирање новог разумевања и размену размишљања. Штавише, ученици су имали прилику да уче једни од других и да виде, деле и изражавају различита гледишта. Коначно, ово се истраживање може сматрати првим кораком ка преиспитивању начина на који се онлине и образовање на даљину може организирати како би се омогућила заједничка рефлексија и помогло студентима да постану критичнији у изградњи свог знања током групних дискусија. На овај начин, рефлексно размишљање би могло постати навика ума, а не само површни и обавезни део дизајна курса.

Поглавље 7 даје резиме главних резултата и закључака из све три емпиријске студије и оцењује општу подобност mARC модела. Резултати представљени у овој тези подвлаче да је креирање искуственог окружења за учење у високом образовању сложен и слојевит процес. Стога је важно да наставници имају оквир за вођење наставног и дидактичког дизајна. Поглавље 7 томе доприноси и дељењем неких практичних смерница о томе како систематски редизајнирати и конципирати дуално окружење за учење. Као закључак овог поглавља, формулисани су правци будућих истраживања.

Acknowledgments

Acknowledgements

Luck is what happens when preparation meets opportunity.
Seneca

After these four challenging, exciting, and above all changing years, I feel very lucky for being able to do research at the Faculty of Educational Sciences (former Welten Institute) at the Open University of the Netherlands. Before coming to the OU, I spent some time at universities all around Europe (University of Belgrade, University of Jyväskylä, University of Skopje, University of Sofia, Vrije University of Amsterdam, University of Aix-Marseille, University of Ioannina, and Lancaster University). Various international research grants have allowed me to be an academic nomad for some time, to seek for knowledge, and to look at the education development throughout different lenses. That voyage helped me to wisely choose the place and time to continue my career headed for PhD. So, luck (mentioned at the beginning of this page) wasn't just about being open to and ready for new challenges, but also about being at the right place at the right time.

This PhD thesis would have not been possible without the outstanding support of the many people that accompanied me throughout this long journey. The first ‘thank you’ goes to Hans, who was my daily supervisor. Hans was for me a visionary researcher. From him I learned a lot, and among others how to write better, to be proactive, and to be critical in every aspect of the academic work. I appreciate that he read all those dozens of drafts of texts with endless patience, provided me with feedback, marked all English errors and silly typos, and provided me with suggestions to discover new landscapes and perspectives. In moments, when I felt insecure or when I was losing confidence in my ideas, he supported me and pushed me to follow my research intuitions. The second ‘thank you’ goes to Marjan, who was my promotor. Thank you for being so welcome from the first day. Marjan was for me an inspiring leader. We talked and debated on topics ranging from growing plants to growing knowledge and mind. She helped me to improve throughout my entire PhD journey, and gave me all the freedom to take initiatives, explore, make mistakes and succeed. Many ideas in this thesis come directly or indirectly from many meetings and discussions I had with two of them.

The other ‘thank you’ goes to Olga. Thank you for trusting me and allowing my ideas to be implemented in the course you teach. She always found the time to discuss a research implementation to such a depth that it did make me go deeper into the topic and rethink the designing of education.

I would like to thank the other PhDs who made this research process more enjoyable and fun. Thanks also goes to Social learning group colleagues, but also former T2 and FEEEL research groups members. I could learn a lot from you! I enjoyed discussions during meetings; conversations at the coffee machine; a many happy celebrations of birthdays and various successes; shared cakes and vlaais, lunches in LaCoure, and barbecues outside; walks around Welten (even when we couldn’t escape the rain) - lots of laughs and enjoyable moments. Thank you also goes to the rest of the OU staff/secretariat and colleagues which with their support made my journey possible and pleasant.

Actually, I could never have done this without the support of my family. To my father Gradimir and mother Slavica, thank you for believing in me even when you couldn’t really get what is that I am doing in Heerlen. Thank you for your endless support! I knew that no matter what happened, I could always count on you. For you two, because I know you would like to read this, parts of the thesis are also written in Serbian. To my sister, Ruzica, who witnessed all my peaks and valleys, thank you for every word of support and for boosting my confidence whenever it was needed.

Захвалница

Захвалница

Срећа је оно што се догоди када спремност сретне прилику.
Сенека

После ове четири изазовне, узбудљиве и надасве променљиве године, осећам се веома срећним што сам могао да се бавим истраживањем на Факултету образовних наука (бивши Институт Велтен) на Опен Универзитету у Холандији. Пре него што сам дошао на ОУ, провео сам неко време на универзитетима широм Европе (Универзитет у Београду; Универзитет Јиваскила у Финској;, Универзитет у Скопљу у Македонији; Универзитет у Софији у Бугарској; Универзитет Врије у Амстердаму у Холандији;, Универзитет у Марсеју у Француској; Универзитет у Јањини у Грчкој; и Универзитет Ланкастер у Енглеској). Разне међународне стипендије за истраживања омогућили су ми да неко време будем академски номад, да тражим знања и разматрам развој образовања кроз различите перспективе. То путовање ми је помогло да мудро изаберем место и време за наставак докторских студија. Дакле, срећа (поменута на почетку ове странице) није била само у томе да будем спреман за нове изазове, већ и у томе да будем на правом месту у право време.

Ова докторска теза не би била могућа без изузетне подршке многих људи који су ми правили друштво током овог дугог путовања. Прво „хвала ти“ иде Хансу, који ми је био свакодневни метнор. Ханс је за мене био истраживач визионар, од њега сам научио много, а између осталог и како боље писати, бити проактиван и како бити критичан у сваком аспекту академског рада. Ценим што је са бескрајним стрпљењем читао десетине различитих текстова, говорио ми шта није у реду са мојим писањем, означавао све моје смешне грешке у енглеском језику и давао ми сугестије за откривање нових перспектива. У тренуцима када сам се осећао несигурно или када сам губио поверење у своје идеје, подржавао ме је да следим своју истраживачку интуицију. Друго ‘хвала’ иде Марјан, која је била мој промотор. Хвала ти што сте тако срдачна од првог дана. Марјан је за мене био инспиративан вођа, разговарали смо и расправљали о темама од раста биљака до раста знања. Помогла ми је да се усавршим током читавог докторског

путовања и дала ми је сву слободу да преузимам иницијативе, истражујем, правим грешке, падам и на крају успем. Многе идеје у овој тези долазе директно или индиректно из многих састанака и дискусија које сам водио са њих двоје.

Треће „хвала“ иде Олги. Хвала ти што си ми веровала и дозволила да се моје идеје примене на предмету на ком си предавала. Увек је налазила времена да самном разговара о спровођењу истраживања, са таквом посвећеношћу да ме је често мотивисала на нова разматрања о дизајна образовања.

Желео бих да се захвалим осталим докторантима који су учинили овај истраживачки процес пријатнијим и забавнијим. Захвалност иде и колегама из групе Social laerning, али и бившим члановима истраживачких група T2 и FEEEL. Много сам научио од свих вас! Уживао сам у дискусијама током састанака; разговорима поред апарата за кафу; током прослава рођендана и разних успеха; заједничким колачима и vlai; шетњама по Велтену (чак и када нисмо могли побећи од кише) - пуно пријатних тренутака. Хвала и остатку особља/секретаријата ОУ-а и колегама који су моје путовање учинили могућим и пријатним.

Заправо, ово никада не бих могао учинити без подршке породице. Оцу Градимиру и мајци Славици, хвала вам што сте веровали у мене чак и када нисте сасвим разумели шта ја то радим у Херлену. Хвала вам на бескрајној подршци! Знао сам да шта год да се деси, увек могу да рачунам на вас. За вас двоје, јер знам да бисте волели ово да прочитате, делови тезе су такође написани и на српском језику. Захвалница иде и мојој сестри Ружици, која је била сведок свих мојих успона и падова. Хвала ти на свакој речи подршке, као и на неумереном бустовању самопоуздања кад год је то било потребно.

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