Project-based learning and the development of students' professional identity: a case study of an instructional design course with real clients in Romania

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This thesis results entirely from my own work and has not been offered previously for any other degree or diploma.

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Ioana Hârțescu

Abstract

Instructional design (ID) education is increasingly moving from a model-based to a design-based approach, prompting renewed attention on requirements to align students' and practitioners' professional identities. Yet there is little current understanding of how traditionally-used pedagogies, such as project-based learning (PjBL), contribute to the necessary identity development of students.

This project aims to identify connections between students' development of professional identity and elements of PjBL, based on a two-year case study of an ID graduate course in Romania. Data was generated via observations, focus groups, written reflections and questionnaires. First, using established PjBL concepts, such as related cases, cognitive tools and contextual support, I examine how the course design was deployed and received by the students. Second, using Communities of Practice concepts, such as mutuality of engagement and trajectories, I analyse how students developed their professional identity during the course. Third, I integrate the two perspectives to identify connections emerging throughout the stages of the course.

The findings suggest that incorporating interactions with clients in student projects benefits students' development of professional identity, by facilitating a more complex accountability to a joint enterprise which, in turn, lessens the need for contextual support from teachers. Yet students' existing repertoire of problem-solving, reflection and teamworking skills influences how they use and benefit from elements of PjBL, such as related cases and cognitive and collaboration tools. Additionally, those student teams engaging in joint effort, as opposed to dividing labour, make richer use of the cognitive tools provided, leading to a more inbound trajectory into ID identity.

The analysis has implications for the effectiveness of PjBL courses, as well as for interventions designed to develop students' professional identity. Moreover, the theoretical analysis widens current perspectives about the dilemmas and difficulties experienced by students trying to make the transition into professional life.

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List of abbreviations

CLE   Constructivist Learning Environment

CoP   Communities of practice

ECTS   European Credit Transfer and Accumulation System

FPES   Faculty of Psychology and Educational Science

ID   Instructional design

PjBL   Project-based learning

UB   University of Bucharest

VLE   Virtual Learning Environment

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1 Introduction

1.1 Introduction

This project is situated in the professional field of instructional design. During much of its history, models and processes have been prominent in defining instructional design (ID) which has been viewed as "a systematic process, represented by models, based on theory and grounded in data while focused on problem solving" (Tracey & Boling, 2014, p. 653); this view was reflected into ID education aiming at preparing instructional designers to follow pre-determined steps in order to produce predictable and reliable results (Smith & Boling, 2009). However, research into ID professional practice indicates that experienced professionals don't follow models like recipes (Dicks & Ives, 2008; Ertmer et al, 2008) and, instead, have a pragmatic view of applying what works in the given situation (Sheehan & Johnson, 2012). Given the mismatch between practice and education, it is not surprising that employers see graduates as poorly prepared for the demands of practice (Villachica et al, 2010) and graduates themselves concur (Julian et al, 2000).

In these circumstances, aligning instructional design – practice and education – with more established design disciplines was proposed (in a practitioners and researchers discussion volume coordinated by Carr-Chellman and Rowland, 2017), in order to alleviate its status of "an envious outsider" (Parrish, 2017, p.7). This evolution (discussed more in sections 1.6 and 2.2) has generated changes in the way instructional designers are prepared. Moreover, in the last decades, universities worldwide have been under pressure to produce graduates who can master theoretical ideas, apply them in complex situations and reflectively consider their professional careers (Trede at al, 2012). In this context, instructional designers' professional identity development has become a relevant topic for discussion.

The research is conducted in the context of a graduate course in instructional design for students preparing to become trainers, offered by one of the largest universities in Romania. The faculty has a tradition of attracting practitioners to co-teach specialized subjects, thus providing an increased

relevance of the content and connections with the job market by bringing students into contact with (more) real practice. This tradition of collaboration brings advantages, as well as challenges, especially related to the experience- and knowledge-sharing between permanent teaching staff, and associated teaching staff from industry.

This project uses a case study approach to examine a graduate course in ID, taught by the author as an associate lecturer, over two years, to identify possible connections between students' professional identity development as instructional designers and elements of the project-based learning approach used in the course involving external organizations as clients.

The key argument arising from undertaking this project is that multiple connections can be established between elements of project-based learning and elements of students' professional identity development, in both directions – concerning primarily the involvement of clients in the projects and the importance of certain generic skills, such as reflection, problem-solving, and teamwork. This has implications for the design of courses using project-based learning or aiming to develop students' professional identity, as well as for institutional or wider educational policies.

1.2 Policy context

After Romania's accession to the European Union in 2007, all governmental programmes, regardless of political colour, emphasized the importance of consolidating the country's role and position in the European structures and of including European targets and measures in the domestic agenda (Romanian Government 2009, 2013, 2018). The European Union agenda for higher education prioritizes the need to equip graduates with crucial skills in today's economy such as "critical thinking and a capacity for problem-solving", as well as high-level digital competencies (European Commission, 2017, p. 4). The *Digital Education Action Plan,* adopted in 2018, emphasizes the use of digital technology to support teaching and learning in order to enhance member states capability to take advantage of the rapid digital transformations (European Commission, 2018).

In this context, it becomes important for institutions of higher education from Romania and elsewhere to focus on strengthening the connections of educational programs to professional practice, providing technology support for learning, as well as implementing pedagogies that support reflection and problem-solving. Consequently, training instructional designers who can embed digital technologies in teaching and learning becomes seen as of immediate importance.

Although the European priorities in higher education revolve around enhanced practical relevance, development of problem-solving and critical reflection skills, the actual context of the Romanian higher education presents significant systemic challenges due to severe underfunding of education sector (2.6% of GDP in 2016 compared to the 4.9% European average, Eurostat, 2020) and lack of application of student-centred learning (Matei et al, 2015). In this context, universities and indeed faculties, are searching for local solutions, such as attracting industry specialists to teach students. Systemic solutions, such as establishing formal and permanent collaboration frameworks between universities and the industry, although included in the governmental program (Romanian Government, 2018) have not yet been implemented.

In a policy context emphasizing employability (Suleman, 2018), the capacity of universities to facilitate students' professional identity development and prepare them to adapt to the job market becomes essential. Although offering students possibilities to apply what they learn through internships and placements is a widespread university procedure, research about the development of professional identity at the intersection of university and practice is scarce, as Trede et al (2012) notice in their literature review.

1.3 Research context

My study is located in the field of ID education, which is going through particular changes – detailed in section 1.6 – marking a departure from systems and models and focusing more on the *design approach*, which other disciplines, such as architecture, use traditionally. These evolutions challenge traditionally used methods in the field, such as project-based learning (Tracey & Boling,

2014), to adapt and function successfully under the new paradigm, informed by research.

This project draws on current scholarship on professional identity in practice-based settings, which – as I explain in section 1.7 and later in Chapter 3 – considers almost exclusively the role of more established professional peers, and is almost silent on the role of the client on students' identity development. This missing aspect is significant, since designers' work is very much contextual and clients are an important part of the context. Furthermore, even in the field of design education, scholarship on using projects is quite fragmented and, with few exceptions, does not address issues of identity.

This thesis aims to contribute to scholarship on PjBL implementations in post-secondary education (which Helle et al (2006) conclude to be scarce), by providing a rich description of a PjBL course in higher education and by exploring the connections between students' professional identity development and project-based learning, as a traditional method in ID education seeking to stay relevant in the current design orientation.

1.4 Personal motivation

My personal motivation in undertaking this research comes from the two strands of my work: on one hand, my work as an instructional designer in industry settings, and on the other hand, my work as an associate lecturer preparing graduate students in ID and educational technology.

I started work as an instructional designer during a time when no formal education in this field existed in Romania. Having experience as a trainer and a graduate degree in educational technology from a design-oriented university abroad, my views on becoming a good instructional designer were more aligned with a personal expertise development perspective rather than with the systematic and predictable, process-oriented view that I found at my new workplace, an educational software company in Romania.

One of my responsibilities was to facilitate on-the-job training for novice instructional designers. While the organizational processes emphasized

creating step-by-step guides and procedures, my own experience advised me otherwise. My own ID practice, taking place in various contexts, involving many types of stakeholders, contributed to my belief that recipes for neatly defined categories of problems cannot realistically be defined, since each problem needs an individual approach. As a pragmatist, my belief is that the world is multifaceted and complex, and, together with others, I think that "[t]here is room in ontology for mental and social reality as well as the more micro and more clearly material reality" (Johnson & Onwuegbuzie, 2004, p. 15). In other words, recognizing the complexity of the social reality led me to a non-dualistic philosophy; I found that many practicing instructional designers share a pragmatic philosophical view (Sheehan & Johnson, 2012).

My trajectories through different practices have influenced how I developed as a professional and how I constructed my own professional identity. I felt that my expertise of ID was gained in action, through feedback from clients and peers, trial and error, discussions with colleagues, deliberate reflection and iterative reviews. I tried to facilitate the same approach for my teammates, while working within the constraints of a busy workplace and less than ideal organizational support.

When I became involved in teaching a course with a focus on ID at the University of Bucharest (while also remaining a working practitioner), I tried to emulate similar processes, by involving students in actual design projects conducted with real clients. My goal was not only to equip students with relevant tools, but to let them experience what it is to be a practitioner and how a practitioner builds their expertise from practice. The choice of a project-based learning approach, without formal textbooks and with no distinction between lectures and seminars, was quite remote from the existing local academic practice, even though our faculty is known for accommodating more practice-oriented types of teaching.

My interest in studying the course setting is motivated by the desire to improve my teaching and is aligned to what Schön (1995) described as an epistemology-of-practice, accounting for "the practitioner's generation of actionable knowledge in the form of models or prototypes that can be carried

over, by reflective transfer, to new practice situations" (p. 34). Although Schön privileges the use of action research as a suitable methodology, I, without denying its merits, chose a case study with a reflexive component, which in my view and within the contextual constraints, accomplishes better the important task of making knowledge more accessible for the research and practitioners community and, therefore, more useful.

Chapter 2 explains how my ontological and epistemological beliefs guided the choice of the theoretical framework, and Chapter 4 offers more detail on how they influenced methodological choices.

1.5 Practice context

This study takes place in the Faculty of Psychology and Educational Sciences (FPES) from the University of Bucharest (UB) in Romania. FPES is a relatively new faculty, founded in 1990, with approximately 3.000 students and 70 permanent teaching staff; 20 of them are in the Educational Sciences Department, where the present research was conducted. The ratio of students / teacher is much higher in FPES (around 42/1) than the UB average (around 24/1).

One of the master programmes offered by the department is the *Train the Trainers* programme, established in 2008 with the mission to train professional trainers for the private and public sectors. Trainers can be understood as specialists who design and deliver training, identify learning gaps, create or select learning solutions, as well as monitor and evaluate the effectiveness of the programmes delivered.

The programme has partnerships with training companies and involves, as associate lecturers, professionals active in their fields; apart from bringing increased professional relevance, this approach partially compensates for the understaffing issue. The program is full-time, takes two years to complete and has 120 ECTS credits; around 24 students enrol each year; students have four disciplines each semester, for each of those they meet once a week for three hours, usually in the afternoon.

In 2011, I had the opportunity to co-teach on this programme, as an associate lecturer, the course "Blended Learning. Training Applications", offered to first year students in the spring semester. The aim of the course is to enable students to design learning solutions that incorporate educational technologies. I held weekly three-hours class meetings with students organized in small teams, each team taking on a project from a range of options pre-defined with the clients. The course started with more structured activities in the first meetings and, gradually, teams were given increased freedom to organize their project work, while I remained in a support role, intervening whenever students needed contextual support, but decreasing the amount of unrequested support as the course progressed. I did not teach any specific models; instead, I used the ADDIE phases (analyse, design, develop, implement, evaluate) as a loose overarching metaphor, drawing a parallel between instructional design and other design disciplines, such as architecture and interior design. More details about the course design and realization can be found in Chapter 5, with a general presentation in section 5.2.

Regarding the status of educational technology in FPES, it should be noted that the faculty did not have, at that time, any Virtual Learning Environment (VLE) in use for the students. However, it did have a VLE newly implemented, dedicated to the development of the teaching staff, and I obtained permission to use it for my course. My intent was not only to showcase it as an example of a relevant tool, but also to engage students in actually using the system to support their learning. Other technological resources included video-projectors, interactive whiteboards, a video-conferencing system, computer labs, and a fluctuating Wi-Fi internet connection. Dedicated technical support however was unavailable in the faculty and the general technical support of the university, although willing to help, was located elsewhere in the city and was severely understaffed.

I welcomed the opportunity to co-teach this course, inspired, on one hand, by the entrepreneurial attitude of the faculty and department leadership who modelled and supported resourcefulness, and on the other hand, because I believe that a designer must work within the constraints they have, in less-

than-ideal situations. After teaching for one year using a more traditional approach, I decided to re-think the course in order to incorporate a more design-oriented approach to challenge students to learn by working on projects for real clients. As detailed in Chapter 6, when re-designing the course, I had in mind specific intentions related to students' professional identity development as instructional designers.

1.6 Instructional design field context

In response to the problems in conceptualizing ID education (Brown & Green, 2017), attempts to better understand the ID field have departed from the technical rational view, and made use of metaphors from other domains such as painting (Julian, 2001) and architecture (Reigeluth & Carr-Chellman, 2009), placing creativity in a prominent role (Clinton & Hokanson, 2012). With an increasing awareness of what experienced instructional designers actually do in practice, the ID education field acknowledged its mismatch with conceptualizations of ID from practice and experienced a resurgence of interest in *design* as a better fitted approach, as witnessed by a special research symposium held by the Association for Educational Communications and Technology (Hokanson & Gibbons, 2014). However, *design* is notoriously difficult to define. According to Cross (2001), *design* is not a science, but a discipline: an "intellectual culture" (p. 5) in its own right. Cross defines *design knowledge* as knowledge "of and about the artificial world and how to contribute to the creation and maintenance of that world", gained through engaging in and reflecting on the activities of design, making the artefacts and using them. Hence, *design* is conceptualized very differently from the systematic processes that have often characterized ID education.

During the last decades, *design thinking* – the kind of thinking involved in "the conception and realization of new things" by "planning, inventing, making, and doing" (Archer, 2005, p. 15) – has been foregrounded in a range of disciplines (Johansson-Sköldberg et al, 2013), including ID. This evolution was motivated by the emergence of *design thinking* as a possible way towards solving current social and economic problems whose open-endedness and complexity have proved previous approaches inefficient. Along with *design*

thinking, I further expand in section 2.2 on several key design concepts: *design studio, critique, reflection-in-action, design precedents* which are useful in understanding the evolution of the ID field.

The changes that mark the ID field (West et al, 2017) make it necessary to continue research on ID education and examine ways of integrating practice and learning, which align with my own views on developing ID expertise presented in section 1.4.

1.7 Locating the project

My project is located in two proximate areas of scholarship, chosen for their potential to inform it, and to which I intend to contribute back. I examined these areas in Chapter 3 using the concepts defined by the theoretical framework of project-based learning (Jonassen, 1999) and professional identity in communities of practice (Wenger, 1998), detailed in Chapter 2.

First area of scholarship considers how *students' professional identity development takes place in practice-based settings.* The literature reveals that students from various disciplines experience difficulties in fitting in the already established communities of practitioners they find in the workplaces where they conduct their internships. The majority of articles are silent on students' interactions with the clients or beneficiaries of their work and offer little information about many aspects of the design of learning interventions. It was therefore my intention to conduct a case study that documents how interacting with clients influences students' professional identity development.

The second area of scholarship examines *educational projects in design disciplines.* Looked at from a professional identity development perspective, most authors writing on this topic agree that reflection is essential in becoming an instructional designer, although only a small subset of authors explicitly explore identity concepts or design-specific issues (with the exception of peer review). From a project-based learning perspective, most papers on this topic do not consider involvement with clients, but those that do, report a variety of benefits. The literature is generally not marked by controversies and its findings

are useful in informing the design of a PjBL course, although the aspects specific to design are only rarely emphasized. Thus, my intention of examining issues at the intersection of project-based learning with a real client and students' professional identity development in design disciplines has the potential to make a significant and distinctive contribution.

The main research question that my project seeks to answer is:

RQ1: How are elements of project-based learning connected to students' professional identity development in a real-client, graduate instructional design course in Romania?

In order to answer the main question, the following sub-questions are defined:

RQ1.1: How are elements of project-based learning manifested in the different stages of the course?

RQ1.2: To what extent are elements of students' professional identity developed in different stages of the course?

In order to answer the research question, I chose a case study approach, with both an instrumental (given the use of theoretical perspectives to examine the evidence), and an exploratory component (given the goal of investigating possible connections between the two frameworks as evidenced in the data). The methodology is further explained in Chapter 4.

1.8 Terminology

For the purpose of clarity, I define in Table 1.1, some of the terms that are used in this thesis and may have different meanings in different settings.

Term	Definition
Course	In higher education: a unit of teaching, targeting one subject, lasting one academic term, having a fixed group of students. In Romania, this is also called "a discipline", and has a set number of hours per week, which are usually split between lectures and seminars (though other options are possible). Lectures and seminars are led by the same, or two different teachers, the more senior one delivering the lectures.
Module	A part of a course, or a very small course; is used informally. In this thesis, the term "online module" is used to describe the fragments developed by the students to be used by the clients (sometimes by integrating them in larger courses or programmes).
Clients	The representatives of organizations enrolled in the projects, who communicate their requirements to the students and offer feedback on delivery. E.g., the training manager of a bank.
Beneficiaries	The learners benefitting from the online modules created by the students. E.g., the employees of the bank.
Trainer	A professional delivering face-to-face instruction to a group of learners, in an organizational (not formal education) setting. The trainer might be the designer of the course, or might deliver a course designed by someone else.
Consultant	A professional (usually from outside) who diagnoses a problem and suggests a solution in an organizational setting.

Table 1.1 – Terminology

1.9 Thesis overview

Chapter 2 describes the theoretical framework I use to examine concepts related to students' professional identity development and to project-based learning, both in the context of ongoing changes happening in the ID education field. The concepts described here are later used to examine the literature, thus making it necessary to present them before the literature review.

In Chapter 3, I set out the two areas of literature mentioned in section 1.7 and I analyse them using the lenses afforded by the theoretical framework. Areas less investigated or less understood are then outlined.

Chapter 4 introduces the research methodology. The case study approach used to answer the research questions is presented, together with supporting reasoning for its choice.

Chapter 5 contains an overview of the course design and a presentation of the data from the practitioner's point of view, using the theoretical framework of project-based learning.

Chapter 6 presents the findings related to students' professional identity development, organizing them using the concepts defined in section 2.3 of the theoretical framework.

Chapter 7 integrates the perspectives presented in the previous chapters, establishing links between the concepts of identity and those pertaining to course design, which are evaluated against the existing literature to highlight the contribution to knowledge brought by this project.

Conclusions are drawn in Chapter 8, where I synthesise the answer to the main research question, the limitations of this study, as well as implications for practice, theory, and further research.

2 Theoretical framework

2.1 Introduction

This chapter presents the theoretical framework. It is positioned before the literature review because the theoretical concepts are employed both in the study of literature and the analysis of data. The theoretical framework uses the lenses of *professional identity,* shaped by communities of practice, and *project-based learning,* in the context of changes in the ID education from following models to design thinking outlined in section 1.6.

To conceptualize students' professional identity, I chose the communities of practice theory (Wenger, 1998), because it offers a set of concepts which are useful in analysing the changes in identity (not just an image), are closely connected with practice, and are flexible enough to accommodate disciplinary specifics.

Jonassen's framework (1997, 1999) for designing constructivist learning environments (CLE) was chosen to conceptualize project-based learning, because it provides a detailed map of the elements that are essential in creating a PjBL environment, and it is especially suitable for ill-defined problems, such as the design problems (Jonassen, 2010).

Given my ontological and epistemological beliefs in pragmatism set out in section 1.4, my choice of a theoretical framework and of placing it in such a prominent role is not an obvious one. My reasons for doing so are four-fold. First, although I value approaches that build theory from practice, I do not believe that already defined theory has no place in practice-based research. An endeavour to create solid bridges between the two cannot ignore either. Second, both concepts of communities of practice and project-based learning are derived from practice and enjoy a profound connection with practice, recognizing in different ways its ambiguous and messy character. Third, the concepts need not be used in a constraining or normative fashion, but rather can serve as tools to facilitate the construction of knowledge emerging from practice, in a form valuable beyond that practice – as I hope to do in this work.

Fourth, I believe that research overall benefits from an examination of relationships between different concepts. Although *professional identity* and *project-based learning* are deeply linked in the activity of educators and practitioners, these concepts are almost always researched separately, as I will later show in Chapter 3. In this thesis, I am particularly concerned with the connections between students' *professional identity* and *project-based learning* (as explained in section 1.7), as they are manifest in actual practice.

Although educational projects have traditionally been incorporated in ID programs (Tracey & Boling, 2014), in the context of a changing conceptualization of ID education from applying models to *design thinking*, it is important to understand how traditionally used methods, like *project-based learning*, are currently conceptualized, and how the development of *students' professional identities* can be facilitated in this new context.

In order to investigate how these understandings are reflected in the current relevant bodies of research, I set up a theoretical framework for analysis that includes, on one hand, *students' professional identity* and, on the other hand, *project-based learning*, and explain how selected design concepts permeate each of these phenomena. Figure 2.1 illustrates how the theoretical framework is constructed by the interconnections of these concepts and which area this thesis seeks to contribute to.

Section 2.2 defines selected design concepts: *design thinking, design studio, design precedents, reflection-in-action, critique*, and explains how they relate to concepts from PjBL and CoP.

Section 2.3 introduces communities of practice (Wenger, 1998), useful to understand the development of students' professional identities as instructional designers. The following dimensions of identity are explored and related to design concepts: *accountability to a joint enterprise, mutuality of engagement, shared repertoire,* as well as concepts of *trajectories* and *multi-membership*.
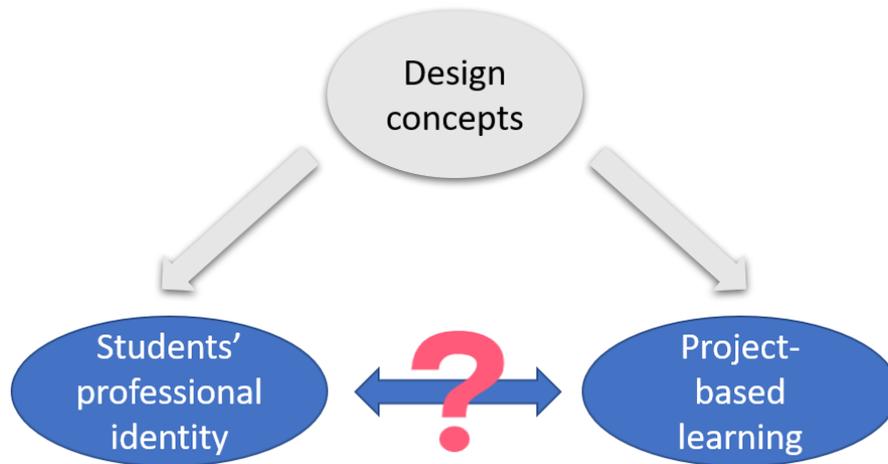
Figure 2.1 - Theoretical framework components

Next, I focus in section 2.4 on elements of project-based learning, a traditional pedagogy in ID education, which I define using Jonassen's (1999) model for designing constructivist learning environments (CLEs), which was explicitly created for ill-defined problems, such as those in the design fields. The place of the previously defined design concepts is also discussed.

I close this chapter with an overview of the theoretical connections – as I see them – between the two framework components, and I highlight the implications for this study.

2.2   The design in instructional design

In section 1.6 I outlined the conceptual changes in ID education brought by the design emphasis emerging from studies of design practice. Since adoption of a design perspective in ID education is a process currently unfolding, defining a set of core concepts helps understanding the new prefigured identity of the ID field; the concepts play a normative role: they are what the practice is oriented towards. This orientation influences how educators facilitate students' *professional identity* development through *project-based learning*, which is the focus of this study. The concepts presented in this section are: *design thinking, design studio, design precedents, reflection-in-action, critique*; they were selected considering the themes put forward by the ID

education research community during a special symposium held in connection with the AECT 2012 conference (Hokanson & Gibbons, 2014).

Dorst (2011) explains the particularities of *design thinking:* when solving open-ended problems, only the desired value (or result) is known beforehand, whereas "the thing" that would provide it (the what) and its "working principles" (the how) are both unknown and should be created. The process of solving design problems uses a technique called framing, a frame being "the general implication that by applying a certain working principle we will create a specific value" (Dorst, 2011, p. 524). This hypothesis can only be tested by creating "the thing", so creation of the object (service, process) goes hand-in-hand with the definition of its working principle. The designer's previous experience helps select a frame that is likely to produce the aspired value. These particularities show that solving design problems is very different from applying knowledge and procedures and, therefore, becomes important to introduce novices to this type of thinking that will shape their identities as designers.

The *design studio* is a concept borrowed from architectural studies and signifies both a place and a pedagogy (Crowther, 2013). As a place, it provides access to resources and dedicated working spaces available both in and outside the classes, encouraging students to work in the studio rather than at home (Cennamo et al, 2011). As a pedagogy, it orients students' work through a design problem, individually or in teams, usually throughout a semester; their work is reviewed by tutors, peers, and outsiders, in formal and informal events. The position of tutors is that of master practitioners and their interventions are oriented towards providing students with experiences they can draw from in refining their designs.

Design precedents are previously encountered solutions that act as references to the designer who recognizes some underlying pattern or similarity between current and previous problems, even if they are from different contexts (Lawson, 2004). This makes design experience an important factor in developing expertise. Expert designers have a large collection of *precedents* they can draw on and are able to recognize patterns and to find tentative matches for the problems they are dealing with. Design students who lack the

experience need to draw on vicarious experience, such as sample solutions from previous students or curated collections of ID cases (Boling, 2010; Howard, 2014). This concept relates to the dynamic aspect of identity – how the students' existing experience influences their further development.

Schön (1991) championed the concept of *reflection-in-action*, defined as an ongoing conversation with an open-ended problem, during which the situation is changed by attempts to understand it, and understood by the attempts to change it. *Reflection-in-action* is how designers work with situations that are inherently ambiguous, unstable, unique, and embody conflicting values (Schön, 1991). *Reflection-in-action* is different from reflection-on-action, which is a retrospective reflection on an experience that has ended. To understand *reflection-in-action*, Tracey and Baaki (2014) found useful Kolb's (2014) experiential learning theory applied at a micro-level, explaining how designers observe and reflect during a puzzling experience, form concepts and try out their new understandings on the design, in a multiple-iteration cycle. Together with *design thinking*, *reflection-in-action* is part of the particular practice of design.

Critique is an essential feature of the studio pedagogy (Cennamo & Brandt, 2012), helping "students learn what it means to be a professional in the design arena" by receiving oral feedback in various forms (Dannels, 2005, p. 140). The desk critique and pin-up types are formative, more informal and frequent, involving either the teacher walking around and offering feedback on students' immediate work, or feedback being publicly given by the teacher and peers while all work is on display. The jury/review type can be held either at mid-project or at the end and it includes a formal presentation by each student, followed by oral feedback offered by teachers and often by guests such as alumni or industry representatives. The open house is also a summative event, similar in process to a poster session where all students stand by their displayed designs and reviewers walk around, stop for presentations and offer feedback. Both giving and receiving *critique* represent a particular way of engagement in design impacting professional identity.

The following section will place the design concepts described in the context of students' professional identity development.

2.3 Students' professional identity development as members of a community of practice

After establishing the context in the preceding section, this section introduces communities of practice (Wenger, 1998) as a framework to analyse and understand the development of students' professional identities in the field of ID. This framework will be useful, as demonstrated in Chapter 3, in examining how the existing research literature reflects the development of students' professional identities, as well as in analysing and interpreting data collected during the research project reported here, as discussed in Chapter 4.

According to Wenger, identity is constructed through a negotiation of meaning between "participative experience and reificative projections" (Wenger, 1998, p. 151), meaning that our identity is not only influenced by how we think and talk about us and our experience, but also by how we live it, how we participate in our day-to-day life. Inevitably, there will be contradictions and discontinuities that will need to be negotiated. As an obvious example, having a diploma and calling ourselves a trainer does not mean that we will approach with perfect ease our first, real-life training assignment. Conversely, though we might see ourselves as "non-technical persons", we might discover that we learn a new piece of software with ease, and as a result we might think more of our technical abilities, which may influence our confidence in the next project.

The "sustained pursuit of a shared enterprise" creates, in time, communities of practice (Wenger, 1998, p. 45). The communities of practice are seen as characterized by three dimensions of competence that translate into dimensions of identity when seen from the individual's perspective (Wenger, 1998). These are: *accountability to a joint enterprise*, *mutuality of engagement*, and negotiability of a *shared repertoire*. The position of the individual in relation to a community (type of engagement, view of the enterprise, and understanding of the repertoire) is not static, but changes over time, describing a *trajectory* of movement influenced by many factors, including the person's own actions and

the particularities of the community. Since the individual is a member in multiple communities at the same time, their *multi-membership* adds another dimension of interaction and reconciliation between communities. Figure 2.2 illustrates how I envisage the dynamics of the dimensions of identities in multiple communities.

I use each of these concepts in Chapter 3, to examine the literature about students' professional identity at the intersection with practice, and about educational projects in design disciplines. In Chapter 6, I use the concepts to analyse the evidence in regard to students' professional identity development.

The following sub-sections will present each element in turn.
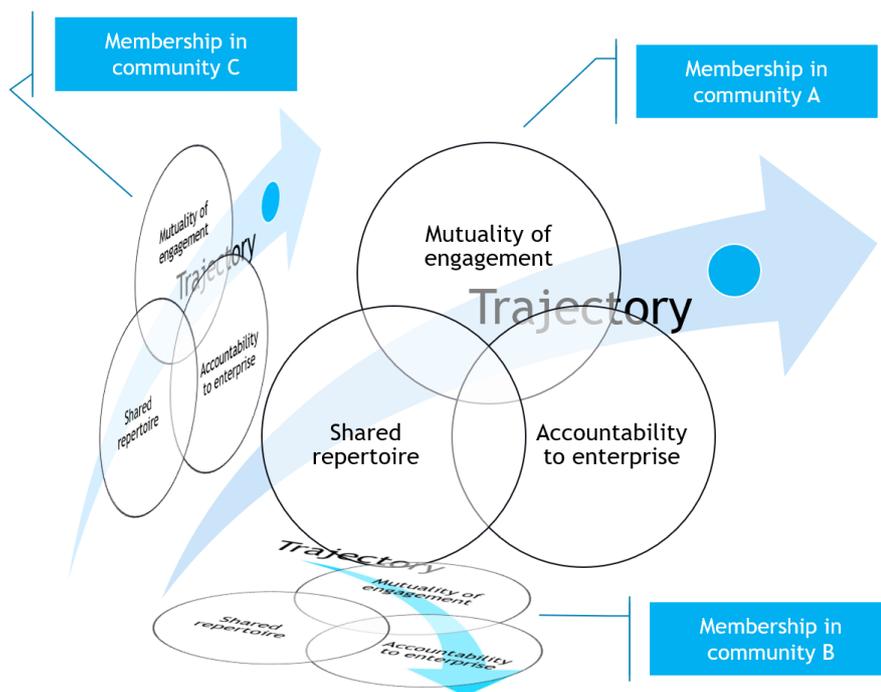
Figure 2.2 - Multi-membership dimensions of identity on trajectories

2.3.1 Dimensions of identity

2.3.1.1 Accountability to a joint enterprise

Accountability to a joint enterprise means feeling responsible to the purpose of the practice (what the members of the community aim to achieve), which shapes how they see the world by creating "a tendency to come up with certain interpretations, to engage in certain actions, to make certain choices, to value certain experiences" (Wenger, 1998, p. 153). This purpose or enterprise is not only the one officially and externally defined, but also one that is mediated by the "community's production of its practice" (p. 80). For instance, students are accountable to the enterprise of passing the exams, but also of satisfying their own learning goals, and working effectively with their colleagues.

In the case of designers, since their work is not about applying rules and procedures in a pre-defined way, the problem they seek to solve remains an important element of their joint enterprise. When using *design thinking*, as explained in section 1.6, designers consider the problem and its context in order to determine how to frame it and what working principle can be used in the construction of the solution. Then, in successive iterations, they rebuild and refine the solution to match their increasing understanding of the problem. Moreover, as designers gather experience, they start to define their own preferences for approaching problems and solutions, their own designer voice, and this also becomes a source of accountability.

2.3.1.2 Mutuality of engagement

Mutuality of engagement defines how members of the community interact with each other, and what are their expectations in relation to working together (Wenger, 1998). It is what differentiates the members of one community from another community.

For instance, lawyers will work in the same team to represent a client and their interactions will be governed by well-defined rules, while they will interact with the other party's legal team in a different manner, equally regulated. Designers in all fields may work on projects individually, or alongside

colleagues in a *design studio*; a specific type of *engagement* that differentiates them from other communities is the *critique process*, which is absent in other fields or takes different forms, such as the peer review process in academic journal publishing. When working in teams on a design project, designers may be engaged in oral *reflection-in-action*, or they may create "communities of convenience" (Schwier et al, 2004, p. 80) to share experiences in order to enlarge each other's *design precedents* base.

2.3.1.3 A shared repertoire

The *shared repertoire* includes artefacts, language and procedures of a community of practice (Wenger, 1998). The word repertoire is chosen to signify not only a collection of resources that are available for use, but also its "rehearsed character" (Wenger, 1998, p. 83), the fact that it emerged and is continuously refined through practice.

In organized practices there is an acquired part of the repertoire, defined by the resources and tools specific to the trade and the organization, such as ID techniques to analyse the needs, to create a storyboard, knowledge of media capabilities and skills in using authoring tools. In established design practice, these might include *design thinking*, how to use *precedents*, how to *reflect-in-action*, how to offer and receive *critique*. However, a new community member will need to understand the subtle ways in which these practices are enacted in the localized and contextualized community. This is the kind of repertoire that even a seasoned professional must negotiate when joining a new community of practice. In the case of students, the official repertoire introduced by the course is obviously a new one, but how they incorporate it in their practice might vary.

2.3.2 Trajectories

Identity is not a state that we achieve once and for all, but it is fluid, in constant change throughout our lives. Wenger (1998) introduces the term *trajectory* to signify the "continuous motion" of the identity with "a momentum of its own in addition to a field of influences" (p. 154). Being "on" a trajectory can

be defined as having a sense of where we are and where we are heading to. This understanding allows us to decide "what matters and what does not, what contributes to our identity and what remains marginal" (p. 155).

In relation to a community of practice, the trajectory can take particular forms (Wenger, 1998):

- Peripheral. This trajectory does not lead to full participation in the community, either because it is not possible or because the individual chooses not to, but it still has a significant impact on one's identity.

- Inbound. The trajectory is directed towards becoming a full member of the community. It is the usual trajectory of novices invested in becoming professionals.

- Insider. It is the trajectory of full members inside the community, as their practice unfolds.

- Boundary. This trajectory is intended to link communities of practice without becoming a full member in any of them.

- Outbound. This trajectory leads out of a community, either by choice or by necessity, bringing significant learning and impact on one's identity.

Typically, the trajectory of students is presumed (for example, by teachers) to be initially peripheral, but inbound oriented, though the reality may differ from these assumptions. This concept is, thus, important in examining the dynamics of the dimensions of the student's identity from novice to at least advanced beginner until graduation.

In conjunction with the concept of multi-membership, the concept of trajectory adds multiple dimensions to the students' identity.

2.3.3 Multi-membership

Multi-membership refers to being member in more than one community, possibly on different trajectories in each of them, and the mutual influences between these different memberships.

Students may be on an inbound trajectory on their chosen profession, but they may also be on an insider trajectory into the students' community, on a peripheral trajectory on their part-time job they took to support their studies, and on an outbound trajectory from their family of origin, who is no longer supporting them with the logistics of everyday life. Identity is understood as reconciling this "nexus of multi-membership" (Wenger, 1998, p. 158) by "creating bridges [..] across the landscape of practice" (p.161). Multi-membership can be manifested by temporal synchronicity and by carrying elements of old memberships into new communities.

The reconciliation between memberships – a private enterprise, corresponding to each individual's unique mix of communities and trajectories – happens by resolving the tensions across dimensions of competence:

- Ways of *engaging* with practice are different in different communities (for instance formal address in Romanian academic settings versus more relaxed atmosphere in many organizations).

- Different responses may be required to the same circumstances according to different *accountability* forms (for instance, students may be conflicted regarding meeting formal assessment requirements versus meeting clients' requirements in a real-client project).

- Elements of the *repertoire* may be incompatible in different communities or may have different meanings (a functional prototype of a course design without real content will mean, in classroom, that some valuable learning took place, while in the client context might mean much less, and perhaps less functionality with real content would be preferred).

In the context of incorporating design concepts into ID, multi-membership is especially relevant in connection with the prominent role experience plays in the use of *precedents* in *design thinking*.

2.4 Project-based learning

PjBL is widely used in university education, especially in engineering and design-related education (Calvo et al, 2010; Kolmos & deGraaff, 2014; Lee, 2009; Tseng et al, 2013).

Two features encapsulate the essence of this strategy: (1) PjBL involves students in the solution of a problem that orients their efforts (Blumenfeld et al, 1991; Thomas, 2000), and (2) the result is the construction of an end product (Blumenfeld et al, 1991; Prince and Felder, 2007). The second feature – construction of an artefact – distinguishes PjBL from problem-based learning (Perrenet et al, 2000) which nevertheless shares with PjBL enough features to make some of the literature mutually relevant. In fact, there are universities who use a project-organized, problem-based learning approach (Kolmos et al, 2004).

I based my framework on Jonassen's model (1999, 2010) for designing constructivist learning environments. In recent years, Jonassen's model was used to inform the design and evaluation of CLEs across geographies and at various educations levels (Somabut et al, 2016; Unal & Cakir, 2019), and for various learning purposes: to investigate Croatian students' perception of CLEs (Gazibara, 2018), to support learning of German as a second language for Italian students (Bandini, 2018), or to improve students' comprehension of scientific texts (Mühlen et al, 2018).

Although the framework was initially created to be used in the design of online environments, in the present context its application will be extended to blended learning environments, defined as a combination of face-to-face and technology mediated learning (Garrison & Kanuka, 2004). In this respect, more flexibility is present to offer some of the features in face-to-face interactions, instead of, or in addition to online interactions.

The theoretical concepts I selected are illustrated in Figure 2.3. Students are provided with the elements of the problem-project space: an ill-structured problem, its context and possibilities to solve it by producing an artefact. Teachers are offering students access to similar cases. Cognitive and collaboration tools help students represent and manipulate the problem, and facilitate co-construction of meaning, respectively. Teachers offer students affective, cognitive and meta-cognitive contextual support.
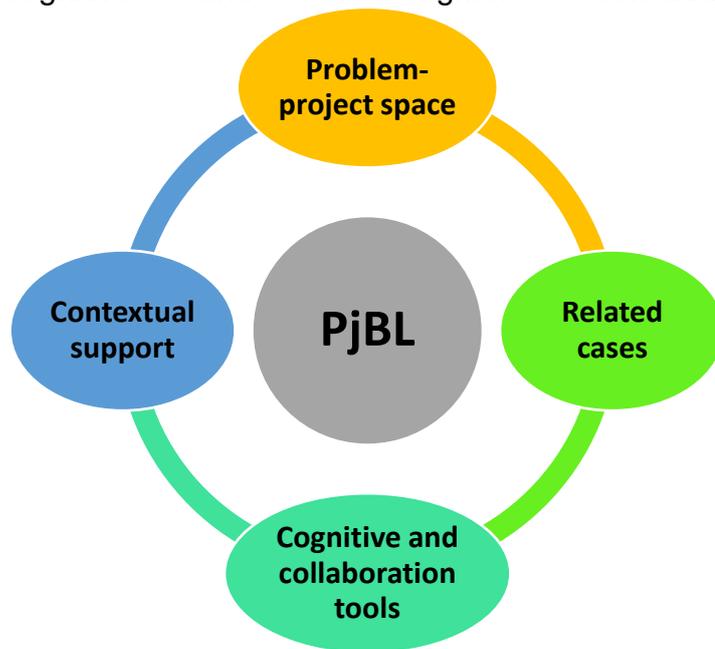
Figure 2.3 - Project-based learning elements (based on Jonassen, 1999)

Each of the elements – presented below – will be used to examine the scholarship on educational projects in design disciplines in Chapter 3, and to analyse the data about the course studied in Chapter 5.

2.4.1 Problem-project space

A problem is "a question or issue that is uncertain and so must be examined and solved" and that has "some social, cultural, or intellectual value" (Jonassen, 2010, p.1). The problem (the first feature of PjBL) needs to be meaningful for students (Lam, 2012), grounded in real life (Thomas, 2000), and address the kind of interdisciplinary issues students will encounter in their professional activity (Heitmann, 1996; Mills and Treagust, 2003).

Of the six types identified by Jonassen (2010), design problems are placed at the ill-structured end of the continuum, as they do not have a predictable outcome, not all of their elements are initially (or ever) known with certainty; their solutions need to satisfy multiple and conflicting criteria. Given this uncertainty, deciding from the onset the rules and procedures required is problematic. As discussed in section 2.2, studies of ID practice revealed that designers have a pragmatic and contextual approach, not using rule-applying, but goal-driven decision making as the main process (Jonassen, 2010).

2.4.1.1 The problem context

The *problem context* includes the performance environment and the community of stakeholders (Jonassen, 1999). The performance environment refers to the organizational setting where the problem occurs, its history, mission, structure, current situation and relations with its own environment. The community of stakeholders includes the people affected by the problem, their values, beliefs, expectations, and ways of engagement.

A real context is especially important for design problems, because it allows students to examine the problem themselves, rather than rely on second-hand data. Danford (2006) and Lopez and Lee (2005) support the view that students should work with real organizations, on the same kind of issues solved by practitioners, with similar constraints and contradictions.

2.4.1.2 The problem representation

For an engaging *problem representation,* both the authenticity of the problem, and of its presentation need to be ensured. An authentic problem is one that targets relevant activities of the practice for which learners are preparing, or a problem in which the learners have a personal interest (Jonassen, 1999).

To engage learners and enhance authenticity, the problem representation can use stories, videos, virtual reality, and simulations. Although for younger audiences personal interest may trump practical relevance, in post-secondary education they are seen as more interrelated. In projects conducted

with real clients, meetings can be arranged between students and clients in order to experience the problem definition and analysis in the actual setting and with the actual stakeholders involved. This is customarily done after the tutors have negotiated the general specifications of the problem with the client organization, to ensure both relevance for the learning goals and feasibility in relation to students' level and academic constraints.

2.4.1.3 The problem manipulation

The *problem manipulation* space "provides the objects, signs, and tools required for the learner to manipulate the environment" (Jonassen, 1999, p. 223). The interest and value students see in a problem is also dependent on their perceived capability of creating a solution and their freedom to choose the methods and outcomes (Blumenfeld et al, 1991).

While a normative, directed approach can decrease engagement and motivation, too much freedom and choice may equally confuse the novice designers. Given that design problems do not have an obvious solution, the latter is seen as more likely to happen than the former. Another important aspect of the manipulation space is the possibilities learners are provided for testing whether their solution, either final or intermediary, is a good one. This can be done in the literal sense, by seeing whether the artefact created performs as expected, or by asking students to present their products to relevant stakeholders.

2.4.2 Related cases

Related cases are collections of similar problem-solving experiences and have two distinct roles (Jonassen, 1999).

The first one is to scaffold students' memory or to supplant it in cases of no similar previous experience. When people encounter a problem, they usually search their memory for similar experiences and try to match the elements of those experiences to the current one's. If there is a sufficient match, they will determine whether they can use or adapt any of the lessons from the past to solve the present challenge. Since students usually lack experience, giving

them access to related cases enables them to start creating mental models of problems and possible ways forward.

The second role of related cases is to provide cognitive flexibility (Spiro et al, 1988) by showcasing an array of different perspectives and approaches that practitioners can have in solving the problems of their domain. Being exposed to a variety of cases helps students to avoid oversimplifications of complex concepts, and facilitates an understanding of the context-dependent factors in the problem-solving process, preventing an overreliance on decontextualized theories, models and principles.

The concept of *related cases* is strongly connected with the concept of *design precedents* (see section 2.2).

2.4.3 Cognitive and collaboration tools
2.4.3.1 Cognitive tools

Cognitive tools are defined by Kim and Reeves (2007, p. 224) as "technologies that learners interact and think with in knowledge construction, designed to bring their expertise to the performance", to support exploration, articulation and reflection. The cognitive skills needed to solve the problem are dependent on the context and features of the problem (Perkins & Salomon, 1989), but several categories of tools might prove useful: problem/task representation tools, static and dynamic knowledge modelling tools, reflection tools, and performance support tools (Jonassen, 1999; Moon, 2004).

Problem / task representation tools help students organize, structure, evaluate, revise and elaborate their knowledge (Keller & Tergan, 2005), by creating visual representations which reduce the cognitive load in the process of solving complex problems and enable the sharing of knowledge with others and re-constructing it together. One example are mind-mapping tools, defined as "graphical tools for organizing and representing knowledge" (Novak & Canas, 2008, p. 1), independently of the problem domain.

Static and dynamic knowledge modelling tools provide an environment for the learners to encode their understanding of the phenomena they are

studying (Jonassen, 1999). These tools tend to be domain-specific. In the ID field, storyboarding tools and multimedia authoring tools can be considered knowledge modelling tools. Multimedia authoring tools are software tools designed to enable non-programmers to develop multimedia presentations by using a graphical user interface to specify the content, its layout and behaviour (Arndt & Katz, 2010).

The tools for reflection help learners to "recapture, notice and re-evaluate their experience, to work with their experience to turn it into learning" (Boud et al, 1993, p. 9). In an academic context, reflection has a "conscious and stated purpose [..] with an outcome specified in terms of learning, action or clarification [..] most likely to be in a represented (e.g., written) form" (Moon, 2004, p.83). This type of reflection is in line with what Schön (1995) called reflection-on-action. The tools for reflection should have word-processing capabilities and need not be specific.

Performance support tools help learners to ease cognitive load, by freeing resources for the higher order thinking processes required. Examples include word processing tools for note-taking, calculators and spreadsheets, databases for organizing resources, presentation tools, search engines, calendars and other planning software, and mobile apps that make support available on the go.

2.4.3.2 Collaboration tools

PjBL often requires students to work in teams, supporting learning through social construction of knowledge, and reflecting the actual circumstances in which practitioners work, which is rarely in isolation (Boud, 2010). Working in teams in the context of PjBL means students need to create a common product based on a negotiated understanding of the issues they encounter in the process.

According to Jonassen (1999), conversation tools should assist learners in several ways. First, students should have a space where they can articulate and discuss their ideas about the topics of interest. These can include

discussion forums, email, chat, videoconferencing tools, social media tools. Second, there should be tools, such as knowledge bases, to facilitate the sharing of knowledge so it can be examined, revised, added to, reformulated. Third, there should be tools to facilitate the creation of a community of learners, where learners educate each other and reflect on the knowledge and the process of constructing it. Connecting to design concepts, *peer critique* (discussed in 2.2) can be viewed as a tool that learners use to learn from each other.

The collaboration tools are more closely related to the task the learners must accomplish together and refer to those tools that assist them in working together to solve the problem through shared decision-making, as well as in reflecting together about the problem-solving process. Since the formulation of this model by Jonassen, computer-supported collaborative learning and work have developed as fields, together with the range of computer-based tools available to learners and teachers.

In blended learning environments, these tools can also take the form of physical spaces, such as the *design studio*, that learners can access to have conversations, share and construct knowledge, and work together.

2.4.4 Contextual support

Contextual support should assist learners in doing something they would not be capable of doing by themselves (Wood et al, 1976). Jonassen's (1999) support types of modelling, coaching, and scaffolding can be reframed using Van de Pol et al (2010) model that distinguishes between five scaffolding intentions grouped in three areas (what is scaffolded) and six scaffolding means (how it is done). The three areas are: metacognitive support (through direction maintenance), cognitive support (through cognitive structuring and reduction of degrees of freedom, and affective support (through recruitment and contingency management/frustration control). The six means are: feedback, providing hints, instructing, explaining, modelling, and questioning. When creating a support strategy, Van de Pol et al (2010) suggest the consideration of three essential characteristics: contingency (adaptation to the diagnosed

competence level of the learner), fading (progressive withdrawal as the learner becomes more competent), and transfer of responsibility (the learner takes increasing control).

2.4.4.1 Metacognitive support

Metacognition includes "knowledge concerning one's own cognitive processes and products" (Flavell, cited in Brown, 1977, p.8), self-regulation, and beliefs and intuitions (Schoenfeld, 1987).

All the six means listed above (section 2.4.4) can be used for *metacognitive support*. For instance, questioning can take the form of providing adequate prompts that can facilitate students' reflection about the state of their learning process, or to question their underlying assumptions and beliefs. Providing feedback on their problem-solving strategies and giving hints about other possible avenues can help improve the way students manage their learning. Direct instruction and explanations may target specific areas such as working effectively in a team, taking effective notes or organizing their time and resources better. The teacher, or another knowledgeable person, can demonstrate these techniques for the learners.

2.4.4.2 Cognitive support

Cognitive support provides structuring and, if necessary, reduces the degrees of freedom of the problem (Van de Pol et al, 2010). Cognitive structuring assists the learners in the process of creating schemas and mental models based on their experiences. Reducing the degrees of freedom means simplifying the problem, or solving parts of it, so the students can solve the rest. All six methods can be used to achieve these goals, as defined and exemplified below.

In higher education, *feedback* is generally understood as written comments the teachers give to students to explain the results of a formal assessment and to suggest future improvements (Scott, 2014). Formative or continuous assessment (Sadler, 1989) means offering feedback frequently along the way, based on a diagnosis of the learner's performance. Feedback is

connected with the *critique* concept in design (discussed in 2.2), which also involves feedback from peers.

Although *hints* are discussed in connection with problem-solving (Schoenfeld, 1992; Pol et al, 2008), they are not specifically defined, so the common meaning of "an indirect or general suggestion for how to do or solve something" (Merriam – Webster dictionary) is adopted. *Instructing* means telling students what to do, or how something is done, while *explaining* involves offering more details, clarifications, or reasons for action (Van de Pol et al, 2010). This sometimes takes the form of a mini-lecture – emphasizing the short duration (Savin-Baden, 2000), or just-in-time instruction – emphasizing delivery at the opportune moment (Hmelo-Silver et al, 2007).

Questioning "calls for an active linguistic and cognitive response" and can be used in order to assess or assist (Tharp & Gallimore, 1988, p. 59). The assessment questions check the students' understanding and are useful to diagnose the learning needs. Assisting questions are used to prompt the learner to perform cognitive operations they would not otherwise do.

Modelling can take two forms (Jonassen, 1999): performance modelling and cognitive modelling. Performance modelling involves showing the steps of the relevant activities, by live demonstration or video tutorials. Cognitive modelling relies on articulating the judgment and decision-making processes of the practitioner while performing the action, connecting to the concept of *reflection-in-action* (discussed in 2.2). This involves explaining not only what is being done, but also why, and inducting learners in the type of reasoning that is expected of them.

2.4.4.3 Affective support

According to Van de Pol et al (2010), scaffolding students' *affect* has two goals.

The first goal is recruitment, which involves getting students' interest in the task and obtaining their agreement to the requirements. Emotional scaffolding can be done through implicit (such as metaphors and analogies) or

explicit means in order to either foster constructive emotions or to reduce unconstructive emotions about the subject matter (Rosiek, 2003). Keller's (2009) ARCS (attention, relevance, confidence, and satisfaction) model can also be used to ensure initial engagement by stimulating curiosity, establishing a connection to issues that learners see as valuable, and strengthening their belief in the possibility of a successful, satisfactory outcome.

The second goal is frustration control, which Van de Pol et al (2010) define as keeping frustration levels low and managing motivation through incentives. The same strategies can be applied, by providing motivational prompts (Jonassen, 1999) and controlling the learners' frustration levels indirectly, through adequate cognitive and metacognitive support.

2.5 Links between concepts

Having defined the two sets of concepts, I move now to briefly present my own position regarding their possible connections. I present this in order to make explicit part of my reasoning in choosing these two sets of concepts together. However, these 'expected' connections were not treated as hypotheses, and I was not trying to either prove or disprove them, nor did they serve to limit my analysis. Rather, I committed them to paper, and I returned to them after the analysis of the data, to determine whether the findings of the study were expected or unexpected in relation to them (as discussed in section 7.2).
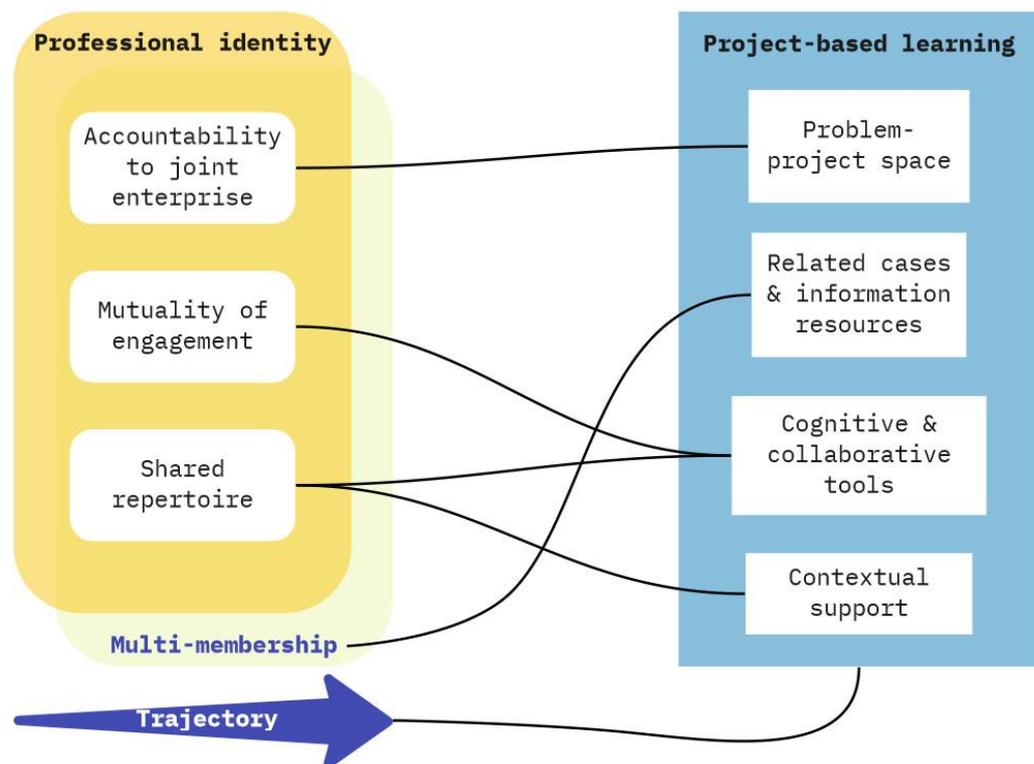
Figure 2.4 - Expected links between the frameworks

As I illustrate in Figure 2.4, I expected connections between the following elements:

- Giving students an ID *problem* to solve and their sense of *accountability* as instructional designers;
- Students' *mutual engagement* by working in teams and using *collaboration tools*
- The *shared repertoire* students develop and the *cognitive and collaboration tools* they use, together with the *support* on using them;
- *Multi-membership* and using *related cases* from students' own experience;
- The whole *PjBL approach* to influence students' *trajectory* towards ID professional identity development.

I acknowledge at this point the vagueness of the above-mentioned connections; I will re-examine whether the literature review has changed this, in section 3.5.

2.6   Implications for the study

I presented in this chapter the theoretical lenses that guide both the analysis of the academic literature to which this research aims to contribute, and the analysis and interpretation of the data collected in the present study.

The theoretical framework chosen for this project facilitates the analysis of ID courses from two complementary perspectives: one that looks at the development of *students' professional identity* as designers while working on a client-based project, and one that examines essential aspects of the course design as *project-based learning*. Together (Figure 2.5), these perspectives contribute to presenting a case study that has both depth and breadth, in the context of changing conceptions of the ID field and a more prominent incorporation of *design concepts*.
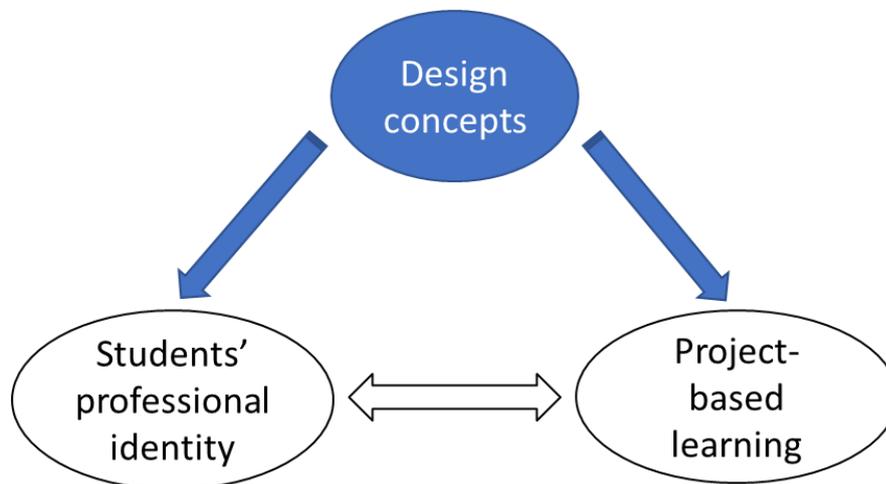
Figure 2.5 - Components of the theoretical framework

Before presenting the research design, I move on to examine in Chapter 3 the work done by other researchers in connection to my interests. The theoretical framework will be used to analyse the selected literature and identify gaps or areas less well understood to which this research might contribute.

3 Literature review

3.1 Introduction

3.1.1 Locating the project

Academic researchers work in communities structured around their fields, disciplines, and particular interests. These fields are interconnected and the communities themselves are alive – they change, adapt, and receive more or less attention from other communities or policymakers. When formulating a research project, therefore, it is important to consider the relevant sources of information on which to draw, since this will influence not only the direction the project takes, but also the choice of the academic communities to whom the work might eventually contribute.

Echoing Merriam (1998), I found that the literature review process is not a linear one. It started with an area of interest, "a hunch" (Krathwohl, 1998, p. 101) motivated by my desire to bring into the university context the experience I had in preparing instructional designers in industry settings through real-life assignments. It further evolved with the choice of the theoretical framework and the articulation of the main research question, which motivated the delineation of the two areas of literature that I will be looking at: (A) *Development of students' professional identity in real-client settings*, and (B) *Educational projects in design disciplines*.
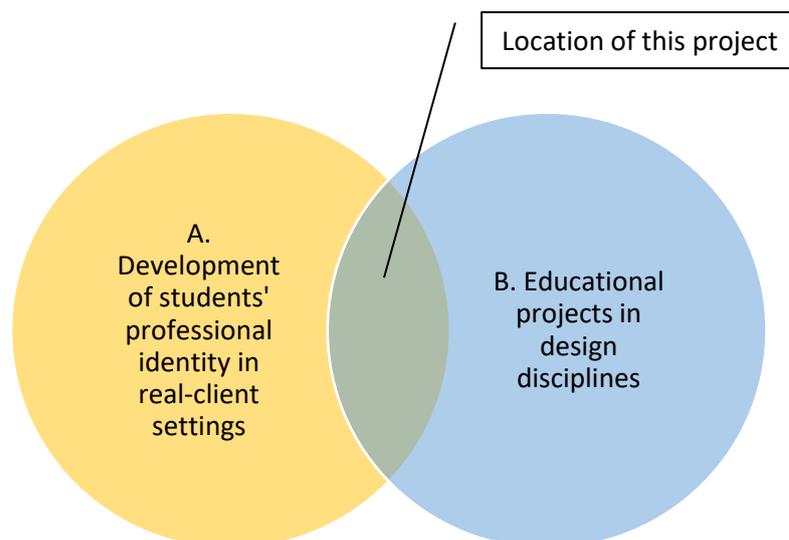
Figure 3.1 - Two interconnected areas of literature

The first area is *Development of students' professional identity in real-client settings*. I chose the phrase *real-client settings* to encompass the whole range of professionally-related activities the students are doing in connection with their university studies, performed in the same setting as a practitioner, found in the research literature under various names: work-integrated learning, internship, placement, cooperative learning, service learning, practicum.

The second area is *Educational projects in design disciplines*. Projects (see section 1.6) are a traditional pedagogy in design disciplines and this literature has the potential to highlight how they are conducted, for which purposes, and what influence the projects might have on design students' developing professional identities.

Of course, some research topics were intentionally excluded from the review, such as research focused on particular identity issues such as gender or minority status, research on identity conducted in professional settings unrelated to university studies, and research on theoretical models of identity. Although informative and with a potential to add context and breadth to the overall image, concerns about feasibility and brevity needed also to be accommodated. Moreover, not focusing on research on particular theoretical models of identity allowed me to define a scope for the literature review which is geared towards a project focused on the development of professional identity.

By building on the selected body of knowledge, this research project aims to contribute to the academic literature on how students' professional identity development can be supported by project-based learning in design-oriented, real-client settings. Although the individual topics receive coverage in both theoretical conceptualizations and empirical studies, the literature review shows that there is a scarcity of articles at the intersection of these themes.

After presenting, in 3.1.2, the strategies used to identify and analyse the selected literature, I examine, in section 3.2, the selected articles on the *Development of students' professional identity in practice-based settings,* using concepts derived from the communities of practice framework described in section 2.3. The same approach is used to analyse identity in section 3.3, using

the second body of articles related to *educational projects in design disciplines*. The same articles are analysed in section 3.4 using the project-based learning framework described in section 2.4. The overall logic is illustrated in Figure 3.2. In section 3.5 the implications for the study are discussed.
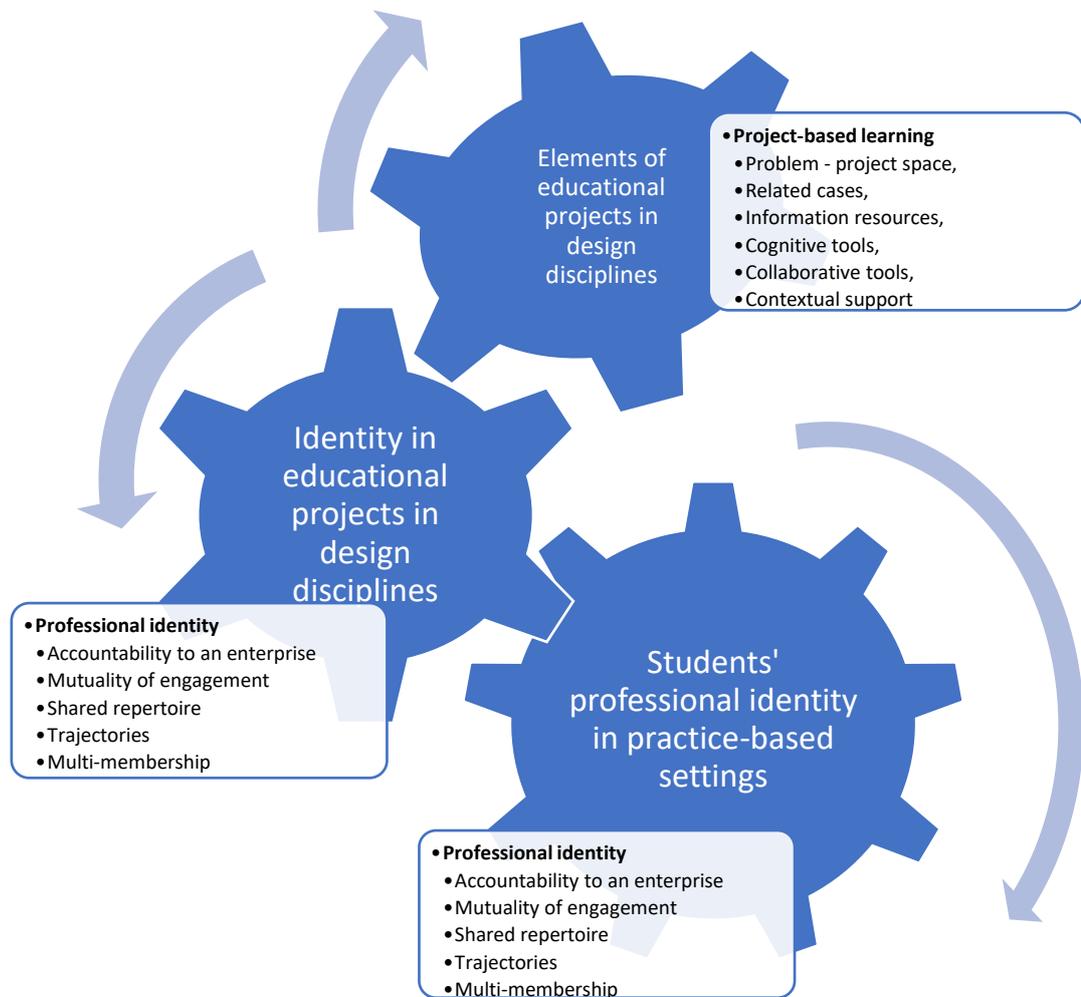
Figure 3.2 - Areas of literature reviewed using components of the theoretical framework

3.1.2 Search and analysis strategy

For both areas, literature search followed the systematic process recommended by Booth et al (2012), starting with a scoping search to become familiar with the literature, identify relevant reviews and journals, and create a list of key terms. Two sources were used: Scopus database – used with the search terms identified, and a bibliography search starting from existing literature reviews and articles identified in the scoping stage. The reference lists

were examined for relevant papers. The bibliography search was conducted in several iterations during the process of examining the full text of the selected articles. I used the date parameter 1999–2019, to capture recent developments but also historical evolutions. Language filters were not established a priori, to allow for studies conducted in a diversity of cultural contexts to emerge.

In order to analyse the literature, I went through four stages. First, I tabulated the articles in each area in a separate spreadsheet and recorded information about the research focus, methodology and methods, setting of research and country, theoretical framework employed, and the authors' results and conclusions. Thus, I was able to form a general picture of the main points emerging from the body of literature, their evolution during the timespan analysed, and the main apparent differences.

Second, I came back to each body of literature and used, in turn, the concepts derived from the theoretical framework to analyse the articles (see Figure 3.2). The concepts were not looked up ad litteram, but rather they were inferred from the authors' presentations of data, findings, and arguments (see Figure 3.3 for an illustration).

Figure 3.3 - Screenshot of analysis spreadsheet

Third, findings were summarized and themes identified across each concept for each body of literature. The themes, together with gaps identified in the literature, are presented in detail in the following sections, structured as shown in Table 3.1.

	Professional identity concepts	**PjBL concepts**
Development of students' professional identity in practice-based settings	Section 3.2	-
Educational projects in design disciplines	Section 3.3	Section 3.4

Table 3.1 - Structure of literature review

Finally, findings were integrated across the two bodies of literature, and connections were identified between the elements of the two main theoretical frameworks.

3.2 Development of students' professional identity in practice settings

This section uses the lens of communities of practice to examine and critique the scholarly literature about the development of students' professional identity during specific periods of engagement with professional practice in real-client settings.

3.2.1 Introduction

Figure 3.4 presents the search and filtering process, starting from Scopus and bibliography searches.
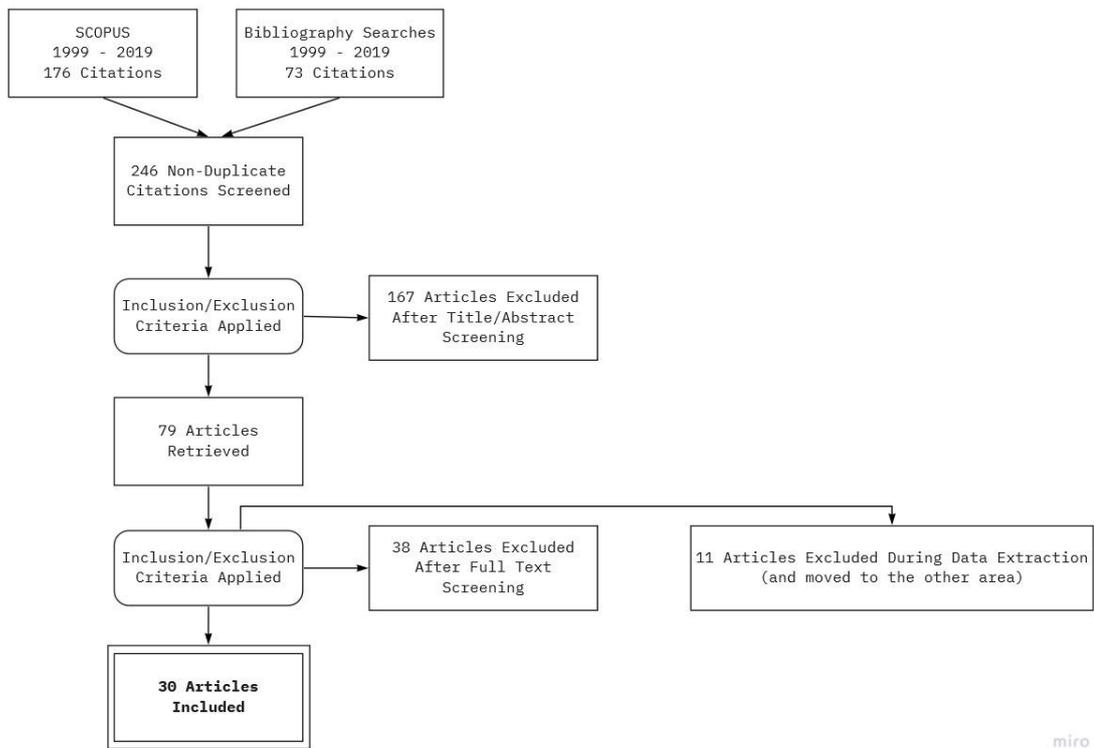
Figure 3.4 - Selection of articles for first literature area

The inclusion and exclusion criteria presented in Table 3.2 were used to define the search terms and to filter the articles.

Inclusion criteria	• Research conducted in relation to students' engagement with professional practice through placements, internships, capstone or real-client projects. • Higher education setting • Discusses aspects of professional identity • Published after 1998
Exclusion criteria	• Research on identity conducted from specialized angles (ethnicity, gender, sexuality, disability, religion, etc)

Table 3.2 - Inclusion/exclusion criteria for first area

Two articles use CoPs as the main theoretical framework, but papers were not selected to match any predefined framework.

Sub-sections 3.2.2-3.2.4 analyse the papers using the CoP lenses defined in section 2.3 (identity, trajectories, multi-membership), while sub-section 3.2.5 draws together the main themes and highlights the potential for this work to contribute.

3.2.2 Dimensions of identity

The following sub-sections examine, in turn, how the three dimensions of identity – accountability to a joint enterprise, mutuality of engagement, shared repertoire – are reflected in the selected articles.

3.2.2.1 Accountability to a joint enterprise

Accountability to a joint enterprise, as emphasized in section 2.3.1.1, means having a common sense of purpose which influences the choices, interpretations and evaluations of experience we make. The reviewed articles reflect this concept by examining the clarity and realism of *the image of what being a professional means*; the progression from a narrow to a socially wide *developing sense of responsibility*; and *the conflicts of expectations* between newcomers and the established communities.

The *image of what being a professional means* is addressed in thirteen of the reviewed articles. Papers reveal that students often have an idealized image of the purpose the professional should serve: for instance, that teachers should spark enjoyment (Beltman et al, 2015; Settlage et al, 2009) or transform the lives of the pupils (Dominguez et al, 2015). After being exposed to practice, although temporary confusion may be experienced (Macdonald et al, 2014), authors contend that some students demonstrate a better understanding of the range of opportunities that exist (Bennett et al, 2017; Mann et al, 2009) or what the practice entails (Hunter et al, 2007; Jackson, 2017; Walker et al, 2014). Whether students start with clear, but idealised images of being a professional, or with a vaguer perspective, the interaction with practice might serve to deliver a more realistic image.

Students' *developing sense of responsibility* is reflected in few of the reviewed articles by the evolution from technical and self-centred enterprises

towards more inclusive, complex ones. Hong (2010) reports that pre-service teachers have a more self-centred position regarding the purpose of the teaching profession, than in-service (including former) teachers who value the social impact of their profession more. Seeing the teaching profession in its social context is the focus of the intervention analysed by Cattley (2007) which supported students in developing a more comprehensive sense of responsibility.

However, some articles argue that *conflicts of expectations* can be found between students and practitioners, such as in studies of teachers' identity (Johnston, 2016; The Literacy Study Group, 2010), engineering students' social responsibility orientation (Rulifson & Bielefeldt, 2017), and pharmacy students' consultative approaches (Noble et al, 2014). What is less understood in the examined papers is the impact of the clients or the beneficiaries (such as pupils or patients) on the students' understanding of the joint enterprise, although these stakeholders are at the core of the practice.

Overall, the papers mainly concur that engagement with practice leads to better understanding of the profession and its wider social implications. However, they seldom examine the role of other stakeholders – apart from established practitioners, and do not identify solutions to the conflicts of expectations.

3.2.2.2 Mutuality of engagement

Mutuality of engagement defines the community members' expectations about how they work together (section 2.3.1.2). The reviewed papers revealed that mutuality of engagement (1) presupposes *awareness of the community*'s existence and (2) *team membership is mediated by competence*. When trying to enter a new community, newcomers can face a range of (3) *problematic situations of mutual engagement*.

Behaving like a community member includes *awareness of the community*. For example, Beltman et al (2015) report that pre-service teachers were not aware of the complex relationships in a school community of teachers,

and Hunter et al (2007) document how involvement with practice and attending conferences improved students' awareness of the community of scientists.

The papers indicate that *being part of the team is mediated by competence.* In Cattley's (2007) report, as students improved their understanding of practice, they progressed from initial difficulties to deeper levels of engagement and better interactions with school mentors – potentially signifying that students were accepted as more competent members of the community. Similarly, Wiele et al (2017) report that marketing students were fully accepted by the client after proving they could offer something of value.

However, the scholarship also reflects a range of *problematic situations of mutual engagement.* In some cases, engagement, although actively sought by the novices, is either: confusing, due to exposure to too many conflicting role models (Bowen, 2018); inadequate, when students – without realizing – fail to behave in the expected way (Settlage et al, 2009); pre-set by naive expectations of total commitment to the profession (Hong, 2010); or refused by the community which makes the students feel unwelcomed (Johnston, 2016). In other cases, engagement is voluntarily withheld by students who are either in disagreement with the community (The Literacy Study Group, 2010), undecided (Zhang et al, 2018) or participating as a last choice (Dominguez et al, 2015). However, in all these cases engagement is viewed *only* in relation to the more experienced members of the community, rather than other stakeholders, such as clients, beneficiaries or fellow students.

The selected articles reveal that involvement in practice makes students aware of the community and that sometimes they are supported and treated like a member; the literature also points to a range of problematic situations of mutual engagement. However, it does not consider engagement with other stakeholders except established members, neither does it elaborate the role of the university in mitigating difficulties.

3.2.2.3 Shared repertoire

The shared repertoire is made of artefacts, language and procedures negotiated by the members of the community. The examined articles highlighted two themes: (1) *the influence of the specific enterprise on the repertoire elements students seek to acquire*, and (2) *a tension between developing student criticality and professional socialization.*

Regarding the *influence of the enterprise on the choice of repertoire*, authors found that early exposure to practice mediates the perceived utility of courses (Mann et al, 2009), while certain skills and knowledge have no correspondent in university learning and could only be gained during practice (Madigan et al, 2019). But exposure is not enough, it is argued; in the case reported by Settlage et al (2009), students' simplistic images of being a teacher led them to acquire limited repertoires. In contrast, the complex image of the teacher's roles developed by the intervention reported by Cattley (2007) prompts students to seek and develop tools and procedures adequate to deal with this complexity.

The most obvious repertoire conflict I identified in the articles concerns the difference between what students learn at university, and what they are required to apply in placements. Articles depict two approaches: one is in line with the process of becoming socialized into the profession and accepting the guidance of the school mentors (Zhang et al, 2018; Deng et al, 2018); another reflecting a clear divide between university and practice methods (Johnston, 2016; The Literacy Study Group, 2010), with no perspectives for reconciliation. A few articles highlight *a tension between developing student criticality and professional socialization*. Although Trede (2012) cautions against the unexamined adoption of existing practices and argues that students should adopt a critical stance, Jackson (2017) and Noble et al (2014) found students are not willing to question the practice, not even when they firmly disagree. While raising a valid concern, this theme is not directly explored in the scholarship.

To summarize, the articles suggest that early exposure to practice may lead to an integrated development of a professional repertoire, which students will find useful in real-world practice. However, research suggests there is a tension between developing student criticality and professional socialization.

3.2.3 Trajectories

A trajectory implies the existence of a starting point, a desired end point or goal, and a movement between them. Several types of trajectories can be identified in the literature: (1) *inbound trajectories supported by programme design elements*, (2) *peripheral trajectories made marginal*, (3) *outbound trajectories*.

Several authors described *inbound trajectories supported by programme design elements.* Dominguez et al (2015) present an approach to the teaching practice from peripheric to more central positions – viewed as concentric layers, from observers to participants, from school context, to class and specific discipline. Cattley (2007) describes how facilitating reflection on identity during an internship can lead to students better understanding the role of the teacher, giving them a clearer picture of where they are going, and thus a stronger sense of identity. Early exposure to practice was found to facilitate the inbound trajectory of the students (Raelin et al, 2014; Spencer et al, 2018) by clarifying expectations (Mann et al, 2009). In the design field, Kunrath et al (2018) showed dramatic changes in self-perception and expectations during a master programme, but their interpretation is impeded by a lack of clarity of the measured constructs (overlap between definitions with strikingly different variation) and by not examining the sources of this change.

In contrast with previously described cases, Johnston (2016) and The Literacy Study Group (2010) present *peripheral trajectories made marginal* by the pressure exerted by the community denying entrance to the students. This has led authors to doubt the explanatory power of the CoP theoretical framework; however, I echo Wenger (1998) in his assertion that practices may, sometimes by definition, be rather hostile or dysfunctional, without ceasing to be practices.

Outbound trajectories leading out of the community were attributed to: difficulty with certain elements of the repertoire, dysfunctional engagement with peers, and an underlying belief in the teacher's role as central (as opposed to the student's) in the learning process (Hong, 2010). It should be noted that no articles examine the inevitable outbound trajectory from the students' community, which is not conceptualized or supported.

In conclusion, for a peripheral trajectory to become inbound, the reviewed articles argue for the necessity of careful orchestration to gradually induce students into the new community, and for facilitation of reflection on their progress. Since the literature suggests that factors impeding this progress are highly contextual, research in each specialized field would be more useful to inform educational interventions.

3.2.4 Multi-membership

Multi-membership refers to being a member in several communities, each with its own purpose, way of engagement and repertoire, and perhaps being on a different trajectory in each. Two themes are identified in the selected papers: (1) *transitioning from being a student to being a professional* and (2) *problematic situations of multi-membership*.

The first theme, *transition from being a student to being a professional* is reflected in the literature by two approaches. The first one, which I characterise as an orchestrated transition, refers to where specially designed elements are embedded in the programme to facilitate the abandonment of the student membership and the adoption of a practitioner one. These elements include reflection on how multiple-layer memberships support each other and lead to inbound progression (Dominguez et al, 2015), or simulating practice elements in the course environment so students stop feeling like students and start considering themselves consultants (Wiele et al, 2017). The second approach, trial memberships, seems characteristic of engineering disciplines: students experiment with memberships during placements until settling into the community of practice of their choice (Mann et al, 2009; Dehing et al, 2011).

Several types of *problematic situations of the multi-membership* were found in the literature. In the case reported by The Literacy Study Group (2010), adherence to student memberships was so strong as to prevent transition to practice. In circumstances less severe, confusion can still occur in the face of mismatch between methods learned in school and the requirements of practice (Deng et al, 2018; Noble et al, 2014), or when faced with additional memberships students were unaware of, such as administrative ones (Hong, 2010). Noting the lack of awareness students have regarding their memberships, Settlage et al (2009) conclude that, although self-confidence is important in forging a solid professional identity, self-doubt is nevertheless essential in keeping it adaptable.

To summarize, many papers point to at least two communities: the communities of learners formed around the academic programme, and the community of practitioners which, in turn, is either seen in the abstract, encompassing all practitioners from one field, or in a very contextualized way, such as a project team in a specific company. The literature suggests that supporting transitions from one membership to another requires careful learning design. Some articles seem to imply that some strategies are more suited to certain domains, but, in my view, more research is needed to illuminate the differences. Although the articles point to some types of problematic situations, such as lack of awareness of other memberships, too strong adherence to student membership, or ambiguous memberships, the research on how to address these problems is scarce.

3.2.5 Summary

Bringing together the five concepts connected to identity leads to an integrated image of how students' professional identity development is reflected in the literature across various domains in connection to practice-oriented settings.

The articles reviewed are in general agreement that early exposure to practice is beneficial to students: facilitating clarity of direction and accountability to enterprises valued by each practice. This in turn influences the

relevance students see in their academic education and the choices they make to acquire elements of professional repertoire. There is also evidence that transitioning from the community of learners to that of practitioners is not straightforward, with mismatches in types of engagement expected and received. Various interventions have been orchestrated to facilitate engagement, but without much attention paid to the role of certain stakeholders, such as clients and beneficiaries.

Even if most authors agree that transitions from university to professional life are not uncomplicated, issues of multi-membership are not considered in sufficient depth neither regarding the two communities of practice involved (university and profession), nor any other influencing memberships the students might have. Although various obstacles to students' inbound trajectories are identified in the papers, how to overcome them is less well understood. Moreover, one of the tensions present in the literature is between socializing students into professions and facilitating the development of a critical stance – questioning the very meaning of an inbound trajectory. Another drawback of the examined literature is that, although qualitative methodologies are predominant, case studies are underrepresented, leading to depictions of partial perspectives, rather than the more integrated perspective that might better assist course designers.

These findings impact my own study first at intervention design level: strengthening its contextual character and underlying key aspects such as early exposure to practice and offering students reflection opportunities to facilitate development awareness. Second, the scarcity of case studies connecting learning intervention design with aspects of identity strengthens my choices of methodology and focus. Third, the absence of the research on clients' influence on the students' professional identity indicates a significant aspect to investigate, where my current work is best placed to contribute.

3.3 Identity in educational projects in design disciplines

This section focuses on analysing articles reporting implementations of educational projects in design disciplines in higher education using the professional identity lens.

3.3.1 Introduction

A search was conducted on the Scopus database using terms reflective of the inclusion and exclusion criteria presented in Table 3.3 below.

Inclusion criteria	• Higher education setting • Reports on a course in ID or other design-oriented discipline • Pedagogical approach of the course is PjBL • Research based on empirical data • Published after 1998
Exclusion criteria	• The course reported on is clearly not design-oriented • The article has a technical approach very specific to its field, which prevents outside understanding

Table 3.3 - Inclusion/exclusion criteria for second area

The reference lists were mined for relevant resources. Searches were conducted in target journals (*International Journal of Art & Design Education, Design Studies, Performance Improvement Quarterly,* and *Interdisciplinary Journal of Problem-Based Learning*). Figure 3.5 presents the search and filtering process.
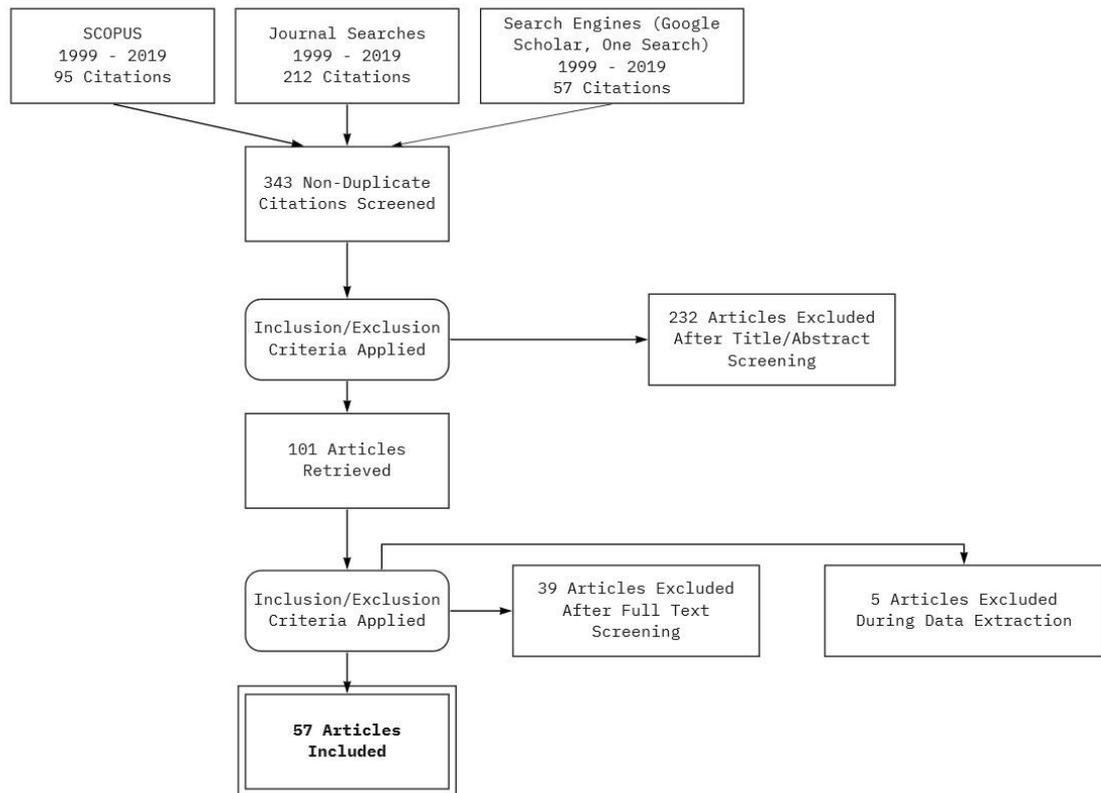
Figure 3.5 - Selection of articles for second literature area

The following sub-sections (3.3.2 – 3.3.4) explore how the selected papers reflect the key concepts of identity defined in the CoP framework (section 2.3) by examining, in turn, the three dimensions of identity, trajectories and multi-membership.

Section 3.2.5 provides a summary of the main themes covered by the selected literature in the area of *identity in educational projects in design disciplines*, outlining how the present research aims to contribute to this body of knowledge.

3.3.2 Dimensions of identity

3.3.2.1 Accountability to a joint enterprise

Accountability to an enterprise (see 2.3.1.1), means having a common sense of purpose which influences the choices, interpretations and evaluations of experience we make. The papers reveal a range of purposes to which students feel accountable, which I grouped into (1) *external: the course or instructor's requirements, the client need, the social impac*t and (2) *internal: own learning, own design, own beliefs*. These are not mutually exclusive, and indeed three papers reflect (3) *interactions between sources of accountability*.

Accountability to an external purpose is illustrated in the papers by: trying to comply with the course requirements (Brill, 2016; Frank et al, 2003; Jensen et al, 2002; Mills 2002), responding to the client's needs (Gestwicki & Mcnely, 2016; Maleki, 2009; McNeill & Chernish, 2001; Tracey et al, 2008), and creating something with a social impact (Amos et al, 2015; Johri & Sharma, 2012; Vemury et al, 2018; Yusop & Correia, 2014). Students' accountability to more complex, evolving purposes, such as course requirements and client need (Budny et al, 2016; McNeill, 2015), or client need and social impact (Dabbagh & Williams-Blijd, 2010; Tracey & Kacin, 2014) is mentioned in the articles as a course feature, without elaborating or explicitly making the link with the students' professional identities.

Accountability to an internal purpose is illustrated in the selected articles by students being accountable to their own learning and development (Dabbagh et al, 2000; Qutadamo & Brown, 2001; Woolf & Quinn, 2001), their own beliefs about teaching and learning (Shambaugh & Magliaro, 2001), and their own design beyond external requirements (Boling & Smith, 2010). Here as well, the orientations identified in the papers might not be the reflection of students' actual choices as much as of the focus of the particular research interest.

A third perspective, highlighting *interactions between sources of accountability*, is identified in three papers. Students are accountable both to the client and their own learning in the case presented by Bannan-Ritland (2001), although details are scarce and only the tutor's perspective is included.

Woolf and Quinn (2009) explore the effect that conflicts between students' learning goals and clients' goals have on student-perceived value. The absence of conflict between clients' and students' expectations is not in itself beneficial, as Cocchiarella and Booth (2015) describe design students having trouble to maintain orientation in the absence of external drivers, indicating they don't yet have a clear inner purpose.

Most papers mention either internal or external sources of accountability, mostly reflecting learning or research design choices. A third, underrepresented research perspective is the one regarding interactions between sources of accountability and their impact on students' professional identity.

3.3.2.2 Mutual engagement

Mutuality of engagement (see 2.3.1.2) defines the community members' expectations in relation to the way they work together and is reflected in the selected articles by (1) *difficulties in engaging with similarly novice peers, (2) benefits of student engagement with peers, (3) peer critique process,* and *(4) interactions with other stakeholders*.

The selected articles describe students' *difficulties in engaging with their similarly novice peers*: students find it easier to work with teammates in companies than with colleagues (Badets, 2017), since the latter are also novices similarly confused about what they should do (Smith et al, 2008). Students want to work alone (Frank et al, 2003; McNeil & Chernish, 2001) and avoid getting involved (Duffy et al, 2013). In online courses, Jensen et al (2002) found that less contact widens differences between participants, other authors describe using very close scaffolding (Williams van Rooij, 2010), or special meetings (Tracey & Kacin, 2014) to facilitate engagement.

In other cases, authors report *benefits of student engagement with peers*: provision of diverse expertise (Johri & Sharma, 2012), facilitation of design judgments (Demiral–Uzan, 2015), practice for synchronizing different opinions (Tracey et al, 2008), accepting different work ethics (Dabbagh & Williams-Blijd, 2010), peer learning opportunities (Cocchiarella & Booth, 2015;

Karaman & Celik, 2008; Dabbagh et al, 2000; Land & Greene, 2000), more complex mental models of design (McNeill, 2015).

A kind of engagement that seems to differentiate the design community (although not unique to design disciplines) is the *peer critique process* (defined in section 2.2). Woolf and Quinn (2001) support its value, but point out that students should know each other well to create the required unthreatening atmosphere. This is echoed by Brill (2016) who reports difficulties brought by not knowing how the review will be received. While Smith (2015) claims that students provide each other with support and stimulating competition, and Qutadamo and Brown (2001) describe students sharing the projects online and being motivated to raise the quality, Bedard et al (2012) report a discouraging competition, perceived as increasing stress and decreasing engagement. Although peer critique and associate forms are present in the reviewed literature, they do not have the prominence expected from a key process, with authors disagreeing both on its value and ways of implementation.

Another theme detected in the selected papers is *interaction with other stakeholders*, such as mentors and non-student co-workers (Johari & Bradshaw, 2008), faculty members as experts (Frank et al, 2003), community members as "design partners" (Yusop & Correia, 2014, p.789), students from other majors (Amos et al, 2015), outside experts (Ashton, 2011; Vemury et al, 2018). Authors report positive examples of engineering students accepted as team members by colleagues from industry (Beier et al, 2019; Lutz et al, 2015). Notably, interactions with clients are missing from the analysis. The opportunities students have to enact their new identity to people outside their peer community are mostly reflected in the reviewed papers in a one-sided way and the complexities of the engagement with stakeholders are largely unexplored.

In contrast to what was found in previously reviewed literature (see 3.2), engagement seems to be reflected in the selected papers primarily with novice peers. Since projects are part of the traditional approaches in design disciplines, this particularity can be attributed both to domain and to method. Although a range of issues are discussed, articles seem to treat engagement in a static

way (as different themes are reflected in different papers). Moreover, processes which are critical to the design field, such as peer critique, are underrepresented and disagreed upon.

3.3.2.3 Shared repertoire

The shared repertoire (see 2.3.1.3) is made of artefacts, language and procedures negotiated by the members of the community. The examined literature is fragmented regarding the types of artefacts, language and procedures focused upon. Four themes were identified: (1) *communication with people having different backgrounds*, (2) *skills development*, (3) *engaging in reflective practice*, and (4) *other design procedures* such as peer review, critical thinking, design judgments.

A frequently reported element related to speaking a common language is the ability to *communicate with people having different backgrounds*, either peers or stakeholders, and harmonize their opinions (Amos et al, 2015; Johri &Sharma, 2012; Tracey et al, 2008; Yusop & Correia, 2014). Although deemed important, it was not successful in all cases reviewed, but the implications for the course design are not discussed.

Being involved in real projects versus learning theoretical knowledge is emphasized by several authors (Badets, 2017; Budny et al, 2016; Dabbagh & Williams-Blijd, 2010; Mills, 2002), as it contributes to *skill development* and highlights the relevance of more theoretical courses (Beier et al, 2019; Gavin, 2011; Joyce et al, 2013). Only one article explicitly articulates the need for students to be involved in design procedures – and not just applications of theory (Lutz et al, 2015).

Engaging in reflection is a procedure mentioned in thirty-four papers, but only nine offer details about its use: Magliaro and Shambaugh (1999) report about encouraging students to make their beliefs explicit and incorporate them in design, while Krogstie (2009) presents a model of retrospective collective reflection supported by collaborative tools. In a cluster of related articles, guided reflection is seen to supplant the novices' limited base of precedents

(Hutchinson & Tracey, 2015; Tracey & Hutchinson, 2013, 2016, 2018a, 2018b; Tracey et al, 2014) but the emphasis is mostly on a quantitative analysis of students' reflective texts.

Other design procedures mentioned in articles are peer review (Ge & Hardre, 2010; Woolf & Quinn, 2001; Brill, 2016), designer judgments (Boling & Smith, 2010; Demiral-Uzan, 2015), using uncertainty in design (Tracey & Hutchinson, 2016, 2018b), critical thinking (Qutadamo & Brown, 2001).

Overall, the scholarship is more concerned with elements of repertoire that are not specific to design (such as communicating with people having different backgrounds and skills development). Of the specific ones, reflection is heavily mentioned but rarely discussed, while other elements are engaged with in sporadic ways.

3.3.3 Trajectories

A trajectory implies the movement between a starting point and a desired end point or goal. The intended trajectory in formal education is considered to be towards the professional community of practice. This is reflected in the selected papers by (1) *becoming more committed to the professional path*, and (2) *conceptualizing the inbound trajectory as an inward journey*.

One theme encountered in the papers is students *becoming more committed to their chosen professional path*, reflected either by a stronger and richer identity (Shambaugh & Magliaro, 2001), by displaying more design-associated behaviours (Demiral-Uzan, 2015), or by acknowledging projects usefulness for gaining access to future employment (Boling & Smith, 2010; Karaman & Celik, 2008; Woolf & Quinn, 2001). In design fields using the studio pedagogy, the students' identity is seen as a natural precursor of the designer identity (Dabbagh et al, 2000; Gestwicki & Mcnely, 2016).

In other articles, *the inbound trajectory is conceptualized as an inward journey,* taken by the novice designer towards expertise (Ge & Hardre, 2010; Hardre et al, 2006), through deeper levels of reflection and self-awareness (Tracey & Hutchinson, 2016) and an increased tolerance of uncertainty (Ashton,

2011; Smith, 2015). Albeit promising, this strand of literature does not illuminate the mechanisms or the factors affecting students' inward journeys.

The selected papers suggest that progression from 'student designer' to 'designer' is not an externally conflictual one, unlike the situation described in 3.2.3; rather than having to deal with the complexities of moving from one context (school) to another (work), students need to dive into their own selves, to make sense of their own experiences through deeper levels of reflection. The more a discipline is closer to design and likely to use some variant of the studio pedagogy, the better the chances seem to a successful transition into the professional identity. However, ID is not a traditional design field; hence the translation of these mechanisms requires further understanding beyond what is currently covered by the literature.

3.3.4 Multi-membership

The concept of multi-membership refers to the interdependencies of being a member in several communities. Although an important factor in design work, only seven articles engage with this concept around two themes: (1) *how multiple memberships influence the development of design expertise,* and (2) *the effects of interdisciplinary projects on students' awareness of the communities of practice they belong to.*

Regarding the *influence of multiple memberships on the development of design expertise*, it is note-worthy that the literature from more established design disciplines (such as interior or media design) does not address the concept of membership directly (the studio pedagogy blurring the difference between being a student and being a professional). However the research indicates that development of design expertise is mediated by having a diversity of previous experiences, while a single, strong identification with a(nother) community is seen as instilling too much self-confidence (Hardre et al, 2006; Ge & Harde, 2010), diminishing the essential uncertainty element (Tracey & Hutchinson, 2016, 2018b), or creating expectations of structure (Badets, 2017; Dabbagh & Williams-Blijd, 2010) or performance (Smith, 2013), which all hinder the development as a designer. Interestingly, being involved in reflective

practice – specific to development as a designer – led students to explicitly reconsider their other identities (Magliaro & Shambaugh, 1999; Shambaugh & Magliaro, 2001), suggesting that the mere presence of a diverse experience might not be sufficient.

A theme less explored concerns the *effects of interdisciplinary projects on students' awareness of the communities of practice they belong to*. Reports in this respect are mixed, as Amos et al (2015) notice the difficulties students face in relating to other disciplines, while Johri and Sharma (2012) argue that, through interdisciplinary projects, students became aware of the community of practitioners involved in designing something, beyond their own disciplinary community. Although many articles report involving students in multidisciplinary projects, the impact on students' identities is not examined.

While experience seems to enjoy a privileged position in building design expertise in practice settings, research in educational settings only engages with this concept in a limited, peripheral way, limiting our current understanding about how programme design can draw on students' previous experiences or concurrent memberships to facilitate their development as designers.

3.3.5 Summary

The previous sub-sections have examined, in turn, how concepts connected to identity are reflected in the literature researching educational projects in design disciplines.

Bringing the five dimensions together, the articles seem to agree about the usefulness of design projects. Even if no major disagreements are present, the scholarship is quite fragmented, addressing a range of topics connected to identity; many studies are exploratory or use grounded theory, signifying an emergent interest. Other attempts to understand design students' identity development use surveys and other quantitative methods, especially in engineering, which further prevents the creation of a coherent image of what is known.

It is worth mentioning that only 13 of the 57 articles included design-related concepts in their theoretical framework, and many of those belong to the same group of researchers. Hence, a significant number of design-specific elements are nearly absent from scholarship, such as design precedents and reflection-in-action. The element of peer critique is the only process that is examined enough to spark some disagreement. Inbound trajectories into the design profession seem less burdened (than was found to be the case in the previously reviewed body of research) by external factors related to the community of practice, as they can better be described as inward trajectories facilitated by deeper levels of reflection. However, articles do not address related issues of how, for instance, students integrate internal and external sources of accountability, or how their previous experience or multiple memberships influence their identity development.

In terms of my own research priorities, the significant drawback of the literature is that issues of identity development specific to design disciplines are insufficiently examined, and even when they are, they are not sufficiently connected to course design to inform teaching practice outside the researched settings.

Having highlighted aspects related to identity in educational projects in design disciplines, I move to examine the same body of literature, this time from the intervention design point of view, using concepts of PjBL.

3.4 Educational projects in design disciplines

3.4.1 Introduction

The selection of articles is described in 3.3.1; to decide whether an article addresses educational projects, regardless of how the author labels the pedagogical approach, I used the characteristics described in section 2.4 – creation of a product that solves a given problem.

The following sub-sections analyse the selected papers through the lens of PjBL concepts.

3.4.2 Problem-project space

The themes identified in the papers are: (1) *compromises being made regarding problems authenticity, relevance and interest for students,* (2) *students' interaction with stakeholders to have a significant influence on their designs and attitude* and (3) *a balanced relationship between giving students freedom and structure.*

The representation of the problem, as detailed in section 2.4.1.2, should emphasize its authenticity and relevance for practice, as well as be appealing to the personal interests of the students. Although all authors emphasize the importance of defining good problems, I found that articles reveal *compromises being made regarding their authenticity, relevance and interest for students*. In most cases, the problems are realistic, but hypothetical, being defined by either faculty (Amos et al, 2015; Bedard et al, 2012; Frank et al, 2003; Mills, 2002; Lima et al, 2007) or students (Demiral-Uzan, 2015; Karaman & Celik, 2008). When students define the problems themselves (Jensen et al, 2002; Land & Greene, 2000; Magliaro & Shambaugh, 1999; Qutadamo & Brown, 2001), it is unclear how they are supported in selecting relevant problems.

The problem context, detailed in section 2.4.1.1, includes the performance environment and the community of stakeholders. Of the 57 articles, only 15 examine projects with a real client or beneficiary with whom the students could interact. Authors reported *students' interaction with stakeholders to have a significant influence on their designs and attitude*, leading to a better understanding of the complexities of the design process, as well as increased motivation brought by the actual possibility of seeing their designs implemented (Johri & Sharma, 2012; Krogstie, 2009; McNeill, 2015; McNeill & Chernish, 2001; Tracey et al, 2008; Tracey & Kacin 2014). Budny et al (2016) claim that students engaged in real-client projects perceive bigger skills gains and better understanding of the profession than their colleagues engaged in traditional projects. Bedard et al (2012) found real-life contexts to be important in explaining persistence in PjBL curriculum, but it is difficult to single out any one influence between the multiple opportunities for industry interactions described.

The problem manipulation space, detailed in section 2.4.1.3, defines the freedom and choice the students have to take action. The papers indicate the necessity to maintain a *balanced relationship between freedom and structure*. Authors indicate that problems should not be too open-ended to be manageable by the students (Johri & Sharma, 2012), control and guidance should leave room for freedom to act (Boling & Smith, 2010), and more freedom should be granted as the project progresses (McNeill, 2015). Descriptions of manipulation spaces include guided environments with pre-defined processes (Tracey & Hutchinson, 2018b), or constraints imposed by instructors' demands (Smith, 2015). In contrast, Cocchiarella and Booth (2015) emphasize the importance of students conducting their design work in a professional studio away from the campus, where the teachers have less influence; their students became so independent that they rejected teachers' feedback in the end, but showed also confusion when clients gave them too much freedom. Similarly, Duffy et al (2013) and Dabbagh and Williams-Blijd (2010) report student difficulties when the context was perceived as too open and unstructured. However, Williams van Rooij (2010) found no significant difference in quality of final projects between the control group and the test group in a structured environment, and Daalhuizen et al (2014), although they found that students using systematic methods felt more pressed, less motivated and less effective than those using heuristic methods, argued that the difference can be ascribed also to the students' mindset toward the method as well as the perceived difficulty of the problem.

Overall, client-based projects are under-represented in the literature and the client influence, although deemed positive, is not examined in detail. Based on the agreement that students' freedom and structure should be balanced, a better understanding of the factors affecting them is needed.

3.4.3 Related cases

Related cases, as detailed in section 2.4.2, are instances of similar, solved problems, offered to provide diversity or to substitute students' lack of experience. Three themes are identified: (1) *provision of a repository of similar*

projects, (2) *students using as related cases their own experience,* and (3) *using colleagues' projects as related cases*.

Some articles describe the *provision of a repository of similar projects* (Johari & Bradshaw, 2008; Johri & Sharma, 2012). However, only Boling and Smith (2010) describe the use of these projects (posted on the studio walls) which however were not used by students until the fifth iteration of the course, but it is hard to discern what factors determined this change. In the case reported by Shambaugh and Magliaro (2001), the ID course itself was presented as a related case, but it is not clear whether students were aware of this.

In the absence of related cases, articles describe *students using as related cases their own experience,* even if non-specific (Dabbagh & Williams-Blijd, 2010; Demiral-Uzan, 2015; Land & Greene, 2000; Tracey & Hutchinson 2013, 2014, 2016, 2018a, 2018b; Williams van Rooij, 2010), sometimes actively prompted by the instructors (Shambaugh & Magliaro, 2001). Studies by Hardre et al (2006) and Ge and Hardre (2010) argue that diversity of previous experience contributed to improved competence through cognitive flexibility (Spiro et al, 1988), implying that both quantity and diversity of previous experience are important. Another way of supplanting lack of relevant experience is using series of projects, where previous projects act as precedents for subsequent ones (Ashton, 2011; Cocchiarella & Booth, 2015) however, this was only envisaged, not actually realized.

Using colleagues' projects as related cases is reported as a source of inspiration (Boling & Smith, 2010; Brill, 2016; Ge & Hardre, 2010), by offering students the diversity of approaches missing from their own experience. However, this only happens late in the design process, when the potential to influence understanding of the problem is low.

Overall, the scholarship suggests that diversity of previous experience is important in using one's own experience. However, as a concept connected to *design precedents* (see 2.2), research on related cases is remarkably scarce.

3.4.4 Cognitive and collaboration tools
3.4.4.1 Cognitive tools

Cognitive tools, detailed in section 2.4.3.1, are technologies that expand the students' thinking process, providing assistance with problem representation, knowledge modelling, reflection, and productivity. The themes identified are: (1) *offering tools at pre-defined moments versus giving access to a library* and (2) *asking learners to reflect on aspects of their projects*.

The first theme highlights two approaches, reported in different papers, regarding problem representation and knowledge modelling tools: *offering tools to students at pre-defined moments versus giving access to a library of tools* for the students to select when they decide. The first approach is found in papers by Tracey et al (2008) and Shambaugh & Magliaro (2001), without further examinations. The second approach implies relying on previous courses (Demiral-Uzan, 2015), or having the instruction available upon request (Ashton, 2011; Dabbagh et al, 2000). A combined approach is reported by Williams van Rooij (2010) who gave students access to a collection of ID tools, but organized their weekly work with tools derived from project management methodology; however, the quality of the test group project was similar to that of the control group. Based on the reviewed literature, a comparison between the two approaches is not straightforward, although both are reported to have benefits and possible shortcomings.

Asking learners to reflect on aspects of their projects is a theme reported by several authors (Bedard et al, 2012; Dabbagh & Williams Blijd, 2010; Hardre et al, 2006; Shambaugh & Magliaro, 2001; Smith et al, 2008; Tracey & Kacin, 2014; Yusop & Correia, 2014). Research conducted by Tracey and Hutchinson (2013, 2014, 2016, 2018a, 2018b) reports using Google Docs as a technical tool and increasingly refined prompts to drive students' reflection. The role of the tool was only discussed by Krogstie (2009) who used data from lightweight collaborative tools to facilitate retrospective collective reflection.

Overall, the tools provided to students are merely mentioned in the articles, without much examination of their use or impact, with few exceptions.

Collaboration tools, as described in section 2.4.3.2, are devices or arrangements allowing students to interact with each other to share knowledge and solve problems together. The themes identified are: (1) *brief presentation of tools*, (2) *bringing together different types of expertise in interdisciplinary projects* and (3) *effect of the peer review process on creativity*.

The first theme highlights a *brief, cursory, presentation of collaboration tools* in the papers examined. In face-to-face courses, authors report collaboration being enabled by meetings during class or organized by the students (Badets, 2017; Dabbagh et al, 2000; Demiral-Uzan, 2015; Frank et al, 2003; Inchbold-Busby & Goldsmith, 2017; Magliaro & Shambaugh, 1999; Mills, 2002; Tracey et al, 2008), with rare accounts of supplementing them by online discussions (e.g. McNeill & Chernish, 2001), and lightweight collaborative tools facilitating retrospective collective reflection (Krogstie, 2009). When courses are conducted online, articles describe students using email and listserv discussions (Qutadamo & Brown, 2001), online discussion boards (Williams van Rooij, 2010), and Google applications and Skype (Tracey & Kacin, 2014). Comparing face-to-face delivery to a blended approach, Jensen et al (2002) notice that frequent face-to-face discussions level the differences between participants, while online discussions seemingly enhance them, since students allocate less time to reflect together, but support for this assertion is mostly anecdotical. The studio pedagogy, although characteristic to design disciplines, is mentioned in only seven articles, and issues exploring how shared space facilitates collaboration are underrepresented in the literature. Tracey and Kacin (2014) offered an online alternative to the studio in their description of how the course prototype served as a communication and collaboration tool, as students left comments and questions for their colleagues.

In the second theme, collaboration is explicitly examined in articles about projects *bringing together different types of expertise in interdisciplinary projects* (Johri & Sharma, 2012; Amos et al, 2015). Authors noted difficulties related to solving conflicts, managing own motivation, increased time demands (Lima et al, 2007). Even when decision making was not efficient (e.g. Dabbagh &

Williams-Blijd, 2010), some students judged the diversity to be reflective of the real world and therefore useful. In another case using studio pedagogy, students engaged in peer learning (Cocchiarella & Booth, 2015).

The third theme highlights the *effect of the peer review process on creativity.* Although articles by Brill (2016) and Woolf and Quinn (2001) argue that peer review contributes to the authenticity of the projects with positive effects, their results are contradictory in one aspect: Woolf and Quinn (2001) claim that peer review frees students from the constraints imposed by the models, benefitting their creativity; however, Brill (2016) identify a perceived reduction in creativity due to the peer review process. Influencing factors are not investigated in either paper. Ge and Hardre (2010) show that peer feedback is seen as beneficial not only for the receiver, but also for the giver who is exposed to a colleague's work and can learn from it.

Overall, the articles list briefly the collaboration tools used and only dedicate more space to their use when special elements are present, such as interdisciplinarity or a focus on peer review. How students choose the tools and the different ways of using them, in connection with other course elements, are less explored in the reviewed papers.

3.4.5 Contextual support

Contextual support refers to, as detailed in section 2.4.4, offering students feedback, hints, instruction, modelling, explanations or questioning to scaffold cognitive, metacognitive, or affective aspects of their performance.

3.4.5.1 Cognitive support

Regarding cognitive support, the main theme highlights the *fragmented landscape concerning feedback implementation and effectiveness.* Although feedback is mentioned in all papers, detail about its implementation is scarce; some authors (Hardre et al, 2006; Tracey and Hutchinson, 2018b) describe an incremental, guided approach, while others give less details. The value students see in feedback varies: in the article by Ge and Hardre (2010), tutors' feedback is valued more than feedback from peers; in contrast, Cocchiarella and Booth

(2015) report about students appreciating the feedback in the beginning, but rejecting it as disruptive towards the end. Smith (2015) report that feedback was viewed by students as either too much direction, removing their voices from the projects, or not enough, when they assumed all mistakes will be corrected; when accompanied by unexpected grades, feedback was completely disregarded (Smith, 2013). In other cases, students expressed the need for more guidance (Karaman & Celik, 2008), or more specific one (Johri & Sharma, 2012). Most authors don't report the effectiveness of feedback; exceptions are Land and Greene (2000) who noticed no positive effects, and Bedard et al (2012) who argued that formative evaluations reduce stress which leads to engagement and persistence, but cognitive effects were not reported. McNeill (2015) is the only author who mentions a fading strategy, although without elaborating.

In is noteworthy that analyses of feedback from clients are largely missing from papers. Although students' perspectives on feedback from teachers are diverse, the causes and impact of these perspectives are less examined.

3.4.5.2 Metacognitive support

Metacognitive support is reflected in the selected papers by two themes. The first reveals the *unclear level of support for raising students' awareness about their thought processes, beliefs and intuitions.* The second theme, showing a more concrete presentation in the articles, is *assisting students in self-regulating their efforts mainly by providing deadlines and reminders.*

The first theme is the *unclear level of support for raising students' awareness about their thought processes, beliefs and intuitions*. Asking students to write reflective texts seems to be the privileged instrument, although papers do not differentiate between the cognitive and metacognitive support it might provide. Moreover, this instrument is pre-defined in the course designs described, raising questions about its contextual character. For instance, Dabbagh and Williams-Blijd (2010) report that, despite organizing initial instruction on teamwork, students faced significant difficulties in their team

processes; however, authors do not present how these were addressed *during* the process. In the rarer cases where feedback was provided to students' reflections, it is not clear what it actually contained; although Tracey and Hutchinson (2018a) distinguish theoretically between feedback concerning the quality and depth of reflection and feedback concerning its content, no further examples are offered to illustrate how these concepts were applied. In another article, Tracey and Kacin (2014) imply that teachers read the students' reflections and addressed concerns at the weekly meetings but the nature of these concerns is not detailed. Few papers examine the impact of reflections on students' projects: for instance, Shambaugh and Magliaro (2001) invited their students to articulate their beliefs on teaching and learning and revise their own model of ID, and Jensen et al (2002) recorded rejection of contextual support for reflection by mature students trying to optimize their time involvement in online meetings.

A second theme is *assisting students in self-regulating their efforts mainly by providing deadlines and reminders*. Authors agree this is an important aspect in PjBL (Badets et al, 2017) and acknowledge that students may oscillate between under- or overestimating their capabilities (McNeil & Chernish, 2001), needing more freedom or more guidance (Woolf & Quinn, 2001), which makes it difficult for the instructors themselves to adapt (Frank et al, 2003). Methods used include deadlines and reminders (Johri & Sharma, 2012; Qutadamo & Brown, 2001), and questioning progress (Jensen et al, 2002). Boling and Smith (2010) notice that by the fifth iteration of their course students became more self-directive, presumably due to incremental course design changes made by the authors.

Both these themes show that scholarship, although recognizing the importance of metacognitive contextual support, offer little details about its implementation or effects and when it does, the focus is mostly on time management issues. Moreover, the contextual nature of the support is often overlooked.

3.4.5.3 Affective support

Two themes are identified: (1) *the support for the uncertainty inherent in the design work,* and (2) *stress induced by obstacles and discrepancies between project difficulty and available resources.*

The first theme is related to *the support for the uncertainty inherent in the design work*. Several papers address it directly by examining manifestations of uncertainty (Tracey and Hutchinson, 2018b) and describing support strategies such as: having supplementary meetings to reassure students (Tracey & Kacin, 2014), providing opportunities to take risks and offer supportive feedback (Shambaugh & Magliaro, 2001), managing "anxiety in action" (Boling & Smith, 2010, p. 168), or modelling the balancing of conflicting aspects (Qutadamo & Brown, 2001). Viewing uncertainty as a part of the process, Dabbagh et al (2000) report having to resist rescuing the students. Ambiguity can also be related to unclear expectations (Smith, 2015), role distribution in teams (McNeil and Chernish, 2001), or offering constructive peer feedback without hurting others' feelings (Brill, 2016). A certain tension in this respect seems beneficial, as Woolf and Quinn (2001) report that a culture that is too supportive may prevent more frank criticism.

Another theme is *stress induced by obstacles and discrepancies between project difficulty and available resources*. Obstacles can be related to teamwork, such as uneven involvement of teammates (Johri & Sharma, 2012) or relationship conflicts (Amos et al, 2015); anticipating this possibility, Gestwicki and Mcnely (2016) described organizing social events to facilitate good relationships in project teams. The low involvement of community members/clients can also increase stress, which was dealt with in weekly class discussion to provide (mainly peer) support to students (Yusop & Correia, 2014).

The importance of the right amount of stress is emphasized by McNeil and Chernish (2001) who argued for keeping a balance between difficulty and frustration, and by Bedard et al (2012) who claim that available support and the right level of stress are the factors that better predict students' engagement with

PjBL. This area is related to other aspects of PjBL: how the manipulation space is designed (section 3.4.2), and cognitive and metacognitive support (previous sub-sections) which can both contribute indirectly to reduce stress.

Overall, only 15 of 57 papers mention elements that could be connected with affective support but authors agree that both stress and uncertainty have benefits and should be managed by the teacher, while the role of other stakeholders, such as clients, is less examined.

3.4.6 Summary

The previous sub-sections have examined, in turn, how PjBL concepts are reflected in the literature on educational projects in design disciplines.

In the examined literature, projects involving real clients are under-represented and when they are researched, clients' influence is not specifically examined. Although problem authenticity is considered important, in cases where teachers or students define the problems, many compromises are made. Authors also agree on the need to maintain a balance between giving students structure and freedom in the process of solving the problems and in using cognitive tools, but, so far, the scholarship is inconclusive on means to achieve that.

Although offering related cases is important for novice designers to enrich their design precedents base, these are not often offered or used by students. When students use their own experience, research suggest both quantity and diversity are essential.

In respect to cognitive and collaborative tools, they are merely mentioned in the papers, without having their use or impact thoroughly examined. It could be objected that they are examined in a different body of research (focused on tool use); I argue that understanding how tools are used in connection with other elements of the course design is important, and therefore I suggest there is a middle way between tools being the focus of research and tools being merely mentioned, which is currently unoccupied.

Regarding contextual support, feedback is frequently mentioned, but rarely examined. The contextual character of metacognitive support, as described by articles, is unclear, as most prompts for reflection are defined at the onset and not changed during the course. Affective support features less prominently in the scholarship, with support for the uncertainty inherent in the design work emerging as a promising line of investigation, as the ID field moves closer to design.

Overall, the literature presents a fragmented image of how educational projects are conducted in the design disciplines by not examining implications of design decisions, or their connections with each other. In terms of my own research priorities, the literature review strengthens my decision to use the theoretical framework of PjBL and professional identity to examine the data, which has the potential to lead to more interconnected findings that can also, at least partially, answer questions of why and how, rather than being mostly descriptive.

3.5 Implications for the study

Bringing together the different analysis strands, I highlight four key points. First, the review of the literature shows that transitions from being a student to being a professional face different challenges in design disciplines than in other domains. If in other disciplines becoming an accepted member of the professional community of practice is sometimes problematic, in design disciplines the development of professional identity is defined as a more inward journey, mediated by reflection. This makes a significant part of the students' professional identity development literature from other disciplines less relevant for researchers and practitioners in ID and emphasizes the need for field-specific research into professional identity development. Second, the current evolutions in ID field are only reflected in a segment of the literature employing design-related concepts. Having an explicit design perspective strengthens the relevance of the present study in the context of unfolding changes. Third, although engagement with practice and conducting authentic projects are seen as beneficial, the role played by the clients in shaping students' professional identities is less well understood and this is an area where my research intends

to contribute. Fourth, although projects are traditionally used in ID, their elements are rarely examined in connection with each other, or with students' professional identity development.

Considering the four points outlined above, and returning to the links I suggested in section 2.5, I note that their precision has not improved, so I set out to present the research design guiding this study, with the aim of establishing better defined connections between elements of PjBL and students' professional identity development.

4 Research design

4.1 Introduction

This chapter presents my empirical approach to explore connections between students' professional identity development and elements of project-based learning in a graduate instructional design course. The research uses a qualitative case study approach. As discussed in Chapter 1, my dual experience as a teacher and ID practitioner motivated me to pursue this topic, not only to understand better how my decisions as a teacher connect with students' experiences, but also to investigate the further significance of students' experiences for their own professional identities' development.

As discussed in 1.6, I suggest that the ID education is currently going through an identity change from being a normative, model-based field, to becoming a design discipline. As a teacher of ID, I find it important to understand how elements of course design connect with students' professional identities development.

Therefore, the main research question is:

RQ1: How are elements of project-based learning connected to students' professional identity development in a real-client, graduate instructional design course in Romania?

To answer this question, two supporting sub-questions are defined, corresponding to each of the two perspectives:

> *RQ1.1: How are elements of project-based learning manifested in different stages of the course?*
>
> *RQ1.2: To what extent are elements of students' professional identity developed in different stages of the course?*

The two sub-questions will contribute to answering the main question not by juxtaposing their answers, as would be the case with different aspects of an object, but by conceptually integrating views from two different vantage points.

In the next section (4.2), I provide an overview of the case study methodology, discuss its choice and the alternatives considered, as well as implementation details concerning the research site, participants and methods. Section 4.3 elaborates on each of the data collection methods, while section 4.4 describes the data analysis and reporting approach. In section 4.5 I discuss the research ethics; rather than providing a set of abstract principles, I describe how I addressed the specific concerns raised by this study, in relation to the empirical strategy used, motivating its position towards the end of the chapter. Section 4.6 acknowledges the limitations of my design and describes how I tried to mitigate them.

4.2 Methodology

4.2.1 Overview

This research uses a case study methodology: the study of the particularities of a single, bounded case (Merriam, 1998). It aims to provide a rich, lively and comprehensive description of entities and events in the context where they unfold, as seen by the involved participants (Cohen et al, 2007). The complexity of the case is reflected by being seen as an entity which is both bounded (Merriam, 1998; Stake, 1995), and in a dynamic relationship with its environment (Yin, 2005).

After reviewing nine typologies of case studies, Tight (2017) suggests that three factors are essential in defining a particular kind: (1) whether it involves one or more cases, (2) if and how it engages with theory, and (3) whether it is meant for teaching or research. This research uses a single case design, the case being a graduate ID course in Romania, and it does engage with theory as elaborated on below. Clearly the case study is used here as a research methodology and not for teaching purposes.

This study engages with theory both by having a starting point in existing theory and by seeking to expand it in several ways. By applying the theoretical framework presented in Chapter 2 to the analysis of both the existing literature and of the collected data, this case study contributes to the operationalization of concepts (Dooley, 2002). By presenting the experiences of participants in a

specific practice, it seeks to contribute to practical wisdom (or knowledge immediately relevant to practice) – noted by Thomas (2010) as a particular characteristic of case study research, and especially relevant in design disciplines, where precedents inform further designs (see 2.2). Overall, the study is an instrumental case study (Stake, 1995) – the case is examined to understand something else, in this instance the relationships between two broader phenomena. By investigating links between elements of PjBL and students' professional identities, this case study also has an exploratory component.

It should be noted that I am conducting this research as an insider researcher (discussed in 4.5), since I teach the course which constitutes the studied case. My multiple role as a practitioner, teacher, and researcher motivated the study and shaped its design in ways presented in the following sub-sections.

4.2.2   Choosing the methodology

My choice of case study as a methodology is motivated by my belief that reality is multifaceted and should be investigated in its complexity, dynamics and from multiple points of view. The potential of the case study methodology for providing a rich description of the case, in its natural circumstances, from a multitude of perspectives recommends it as a well-suited match. As a practitioner with a pragmatic outlook, I value research for its capability to be applied. Case study research speaks the language of experience and is thus useful for practitioners (Stake, 1978), giving readers the possibility to interpret the findings themselves in relation to their own context (Flyvbjerg, 2004).

The case study methodology is also well suited for studying the type of research site examined in this research. The clear boundaries of the chosen university course, as well as the predetermined relationships it has with its context, make it sufficiently bounded and situated to constitute a good case. While in this instance the research site was selected before defining the research questions and methodology, precisely bounding the case within the

site, guided by the theoretical concepts, is still an active process, as described in 4.2.3.1.

In addition, the complexity and dynamics afforded by the case study methodology facilitate the engagement with theory from multiple perspectives, as explained in 4.2.1. As noted in Chapter 3, detailed case studies in higher education contexts are insufficiently represented in the PjBL literature (Helle et al, 2006), and in the students' professional identity literature.

In the process of choosing my methodology, I also considered grounded theory and action research, both being connected to pragmatism and to the epistemology of practice (see sections 1.2 and 2.1). Grounded theory (Strauss & Corbin, 1994) is a methodology for developing theory that emerges from data rather than using theory existing before. This approach was rejected because the development of theory per se was not the main goal. Action research integrates research and action in a series of reflective action cycles, with the aim of improving practice and knowledge about practice (McNiff & Whitehead, 2009). Although improving my practice is still a goal I pursue (beyond this project), I chose to focus first on enhancing my understanding by examining my practice in light of relevant theories. My intention is to develop theory and practice in tandem; hence I rejected these two methodologies which I see as emphasizing theory or practice development in more one-sided ways.

4.2.3 Applying the methodology

This section outlines the selection of the case (4.2.3.1), participants (4.2.3.2) and data collection methods (4.2.3.3).

4.2.3.1 Selection of the case

As described in section 1.5, the research takes place in a graduate course in ID, in a Romanian university. The students are engaged in a PjBL approach where they create e-learning modules for organizations who act as real clients. The case includes two deliveries of the course in two consecutive years, not treated as different cases, since the general course design was the same. Thus, the case is bounded around the *course*, whose very nature is a

stable phenomenon existing within an institution over time and recruiting different student cohorts each year.

Apart from pragmatic reasons related to access, the choice of the case was made in line with Swanborn's (2010) recommendations of selecting cases that are *informative* and *representative*. The *informative* quality of the chosen case stems from the prominence of the studied phenomenon in the research site. The course uses a PjBL approach throughout the semester, with real clients being involved from the inception to the final phases. Being offered at graduate level, issues of professional identity are of immediate concern to the students. To further improve its informative quality, the course was studied along two cohorts, in two adjacent years of study. The *representative* criterion is understood in relation to the theory this research hopes to contribute to. In this sense, this instrumental case is representative as it was defined in relation to the theoretical concepts of PjBL and professional identity in communities of practice.

Although the same course design was used in both years, the types of organizations involved as clients differ: two public organizations in the first year, one commercial and one non-governmental organization in the second year. This diversity contributes to improving the representativity of the case.

4.2.3.2 Research participants

Data was collected from three categories of participants, described below: the students on the course over two years, the clients' representatives and myself, as a teacher.

As described in Chapter 1, given the relatively small size of the cohorts, all enrolled students were invited to take part in the research. Out of the 26 students taking the course in 2013 and 20 students in 2014, 25 and 18 respectively expressed consent to participate. The students' perspectives are important because they are the ones experiencing the implementation of the course design and it is their professional identity development that I am interested in.

According to institutional data and data from the questionnaires (see 4.3.1), the students are mostly female (35 out of 43 students), 24 of them have ages under 25, most of them work in parallel with their studies, some in low-skills jobs, some on clearer professional trajectories with more than 5 years of work experience. Twenty-three of them have bachelor's degrees in pedagogy or psychology, the rest being in economic studies, foreign languages, and communication studies. The assumption regarding students' existing identity used in the course design was that students would generally expect to receive instructions, would not be used to formulate and support complex positions, and would be underestimating their capabilities and interest in technology. For the purposes of the research, students were assigned numbers.

Four client organizations participated in the research and were assigned codes, as presented in Table 4.1. A fifth organization was involved but denied participation. Representatives from each organization were also invited to participate; their perspectives are valuable from both theoretical points of view considered. On one hand, involving the client organizations is an important aspect of the course design, contributing to the authenticity of the project's context; on the other hand, as members of the larger community of practice, the clients' representatives can illustrate the community's perspective on the students' professional identities.

Each of the four organizations typically delegated two persons for the project: one in a supervisory role, and one in a role combining training and subject-matter expertise. All representatives, except those from the commercial bank, were female; ages ranged from 25 to over 60. In the account presented subsequently, participants will be identified with their organization code.

Year	Organization	Code
2013	Organization 1 - **p**ublic organization providing **d**iverse training for public servants	PD
	Organization 2 - **p**ublic organization providing **s**pecialized education	PS
2014	Organization 3 - **c**ommercial **b**ank	CB
	Organization 4 - **ch**arity in the field of information science and libraries	CH

Table 4.1 - Client organizations

Finally, my dual position as the teacher of the course and a practicing instructional designer makes me a participant with a unique perspective on both the course design unfolding, and the students' professional identities development. My professional identity is discussed in more detail in section 1.4.

4.2.3.3 Selecting research methods

One of the strengths of case study methodology is that a variety of methods and sources are used to capture the various perspectives and facets of the case investigated, contributing to the credibility of the research through data and methodological triangulation (Denzin, 2017).

The methods are briefly presented below and described in more detail in section 4.3.

- A **questionnaire** was used at the beginning of the course to collect data about the students' demographics, prior experience with educational technology and PjBL, as well as their background studies and professional experience.
- **Observations** were conducted during five course events, elaborated more in Chapter 5 (the debate on technology versus pedagogy; role-play in preparation for the client meeting; client analysis meeting; peer feedback session; and final presentation to the client), to collect

data about the way students engaged with the project in its various phases.

- **Students' written reflections,** connected to four of the five events described above, plus one done mid-project, were used to understand the challenges and opportunities they perceive in the projects, and how they see themselves and their projects evolving.

- **Focus groups with students** were conducted mid-project to explore issues related to their projects and to professional identity in a setting that allows students to hear, react and build on the perspectives of others, to bring an additional perspective to the individual one drawn from the written reflections.

- **Semi-structured interviews with clients' representatives** were conducted at the end of the project to investigate how they perceived the unfolding of their collaboration with the students.

- A **teacher's journal,** a record of my own reflections throughout the course, was used to add the teacher's dimension to the perspectives of the other actors involved.

Data collection followed the same timeline for each cohort, illustrated in Figure 4.1. Course activities (detailed in Chapter 5) are indicated on the timeline, while the data collection is marked by arrows.

Teacher's journal

Obs 1 Obs 2 Obs 3 Obs 4 Obs 5 Client interviews

Questionnaires Focus group(s)

R 1 R 2 R 3 R 4 R 5

Intro Related cases Debate Role play Client needs analysis D&D D&D D&D D&D D&D Peer review D&D Client presentation Reflection 5
Reflection 1 Reflection 2 Reflection 3 Reflection 4

W1 W2 W3 W4 W5 W6 W7 W8 W9 W10 W11 W12 W13 W14 W15 W16 W17

FEB MAR APR MAY JUN

Stage 1 – Introduction and preparatory activities Stage 2 – Role-play and client meetings Stage 3 – Design and development activities Stage 4 – Preparing and delivering project presentations

LEGEND

Start course / end course / end exams

W1..W17 weeks of the course

D&D design & development activities

Obs ..

Observations of course events (1 to 5)

R ..

Students written reflections (1 to 5)

Figure 4.1 - Timeline of the data collection related to course activities

In my initial plan, multiple interviews with the students were planned throughout the semester but it became clear that students, although willing to participate, did not have much extra time. Therefore, I included focus groups instead and incorporated the data collection into the course activities as much as possible. With the exception of focus groups, all other data draws on activities that would have happened even in the absence of the research project.

The methods of observation, interview and document analysis aim to capture, as much as possible, the naturally-occurring data in the context of the course (Merriam, 1998; Swanborn, 2010), supplemented by participants' explicit perspectives elicited through questionnaires and focus groups embedded into the course. The approach aimed, first, to capture issues that participants see as significant rather than those prescribed by the framework, and second, to capture their views as they developed throughout the course rather than only retrospective views. As a consequence of using multiple data sources, one-to-one relationships between concepts of the theoretical framework and the data collection methods chosen are impossible to define. Indeed, multiple methods were chosen to convey a rich picture from multiple perspectives, which is one of the strengths of the case study.

4.3 Data collection methods

The following sections will describe, in turn, each data collection method used. With the exception of my journal, which was recorded in English, all data collection forms, protocols, guides, prompts, as well as all data was created or collected in Romanian. This is because the course is taught in Romanian and there is no requirement for students to speak or use English.

4.3.1 Questionnaire

As an effective method to collect a significant amount of information from many people in a short timeframe, a questionnaire was used at the beginning of the course to capture students' prior experience and current views on ID and PjBL, and to investigate their expectations from the course.

The questionnaire was defined according to literature guides on phrasing, clustering and ordering items (Krathwohl, 2004). The questions asked about demographics, prior studies, general work experience, experience in the training field, previous experience with PjBL, and course expectations (see Appendix B). Most items were open-ended and those referring to learning technology used a frequency scale. Sample items and their connection with concepts from the theoretical framework are presented in Table 4.2.

Question (English translation)	Associated theoretical concepts
Briefly describe your professional experience.	Multi-membership
What are your expectations for this course in terms of your professional development?	Accountability to an enterprise
Describe a representative instance of project-based learning from your academic studies.	Potentially all concepts related to project-based learning

Table 4.2 - Sample questions from the questionnaire

The questionnaire was administered online using Google Forms with the results available automatically as a spreadsheet. Thirty-two responses were collected (74.41% response rate).

4.3.2 Observations

To be useful, observation should "capture the critical aspects" of the events (Krathwohl, 2004, p. 249). During the course, students were observed continuously for didactic purposes, but five critical instances were chosen as data for this research, as shown in Figure 4.1: (1) the debate on technology versus pedagogy, (2) the role-play in preparation for the client meeting, (3) the client analysis meeting, (4) the peer feedback session, and (5) the final presentation to the client. For a detailed presentation of these activities, please see Chapter 5. The first two activities were audio recorded, and for all activities I kept notes. The activities (3) and (5) happened two times each year, four times in total, corresponding to each client organization.

The activities were chosen for several reasons: first, they naturally required the students to express themselves openly; secondly, no intervention from me was required during their unfolding, so I could focus on observing; thirdly, they were embedded naturally in the course design, thus offering a relevant and authentic context, and fourthly, they were almost evenly spread during the course, so progress could potentially be captured.

Concerning the effect of the observation on the behaviour of the observed (Krathwohl, 2004), the students were already expecting to be observed as part of the learning process. They were informed, and consented, about the use of audio recordings for the purpose of this research. The audio recordings were also used for feedback purposes and were shared with the students so they can observe and reflect on their own performances. The notes from the other three events were also discussed with the participants in class. I recorded all five events verbatim (as much as possible) or by describing the behaviour (such as "presentation of module – slides 1 - 3"). Non-verbal behaviours were also recorded. Figure 4.2 presents an anonymised sample of the notes.
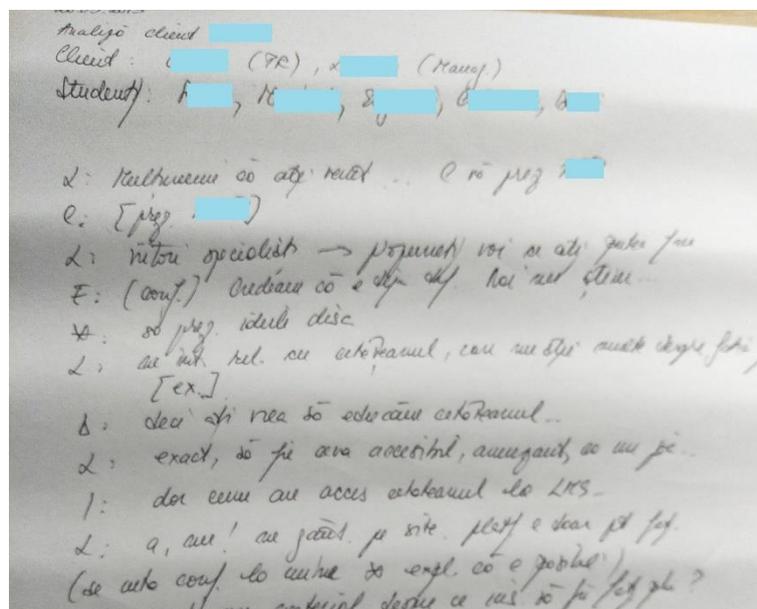
Figure 4.2 - Sample of observation notes (in Romanian)

The observations were interpreted in connection with students' reflections for activities (2), (3), and (5), and in connection with my own

reflections for all of the activities. Clients' interviews were also related to observations on activity (5).

4.3.3 Students' written reflections

Data was also collected from personal documents (Merriam, 1998), in the form of students' written reflections. As shown in Figure 4.1, I incorporated in the course design five individual reflective assignments; three are linked with key moments in the course timeline: preparation for meeting the client, client analysis meeting, and presenting the solution to the client. Two assignments are progress reflections on their projects and views about themselves as instructional designers, in the middle and at the end of the course. Four reflections were submitted online, using the dedicated VLE (Figure 4.3), while one was administered on paper, during class, and subsequently transcribed. The reflection content was not assessed for grading purposes, but students received a number of points if formal criteria of length, topic compliance and time were met.

Figure 4.3 - VLE screenshot with reflection activities

The prompts for the reflections associated with events (first, second and fourth), were created using the four-stage model proposed by Boud et al (1985): (1) returning to experience, (2) attending to feelings, (3) re-evaluating the experience, and (4) outcomes / resolutions. For instance, the translated prompt

for the reflection after the role play to prepare for the client meeting is presented in Figure 4.4. All the prompts are detailed in Chapter 5.

Data limită	29.03.2013 23:55
Status	Neînceput
Interval de notare:	Puncte (Maxim 5,0)

Instrucțiuni sarcină

Reflectați la jocul de rol care a avut loc la întâlnirea precedentă. Scrieți o reflecție personală de aprox. 300 de cuvinte folosind următoarele întrebări ca ghid:

- Ce a fost important pentru voi în acest exercițiu?
- Cum v-ați simțit participând în acest joc de rol?
- Cum v-a ajutat acest joc de rol (dacă e cazul) să vă pregătiți pentru întâlnirea cu clientul? Cum ar fi putut să vă ajute mai mult?
- Considerând experiența jocului de rol, cum aveți de gând să abordați întâlnirea cu clientul?

Folosiți aceste întrebări ca pe niște linii călăuzitoare. Puteți da răspuns la toate sau doar la o parte din ele, și puteți adăuga orice altceva este important pentru voi referitor la experiența jocului de rol în contextul pregătirii întâlnirii cu clientul.

Rezolvare

Această sarcină permite introducerea de text cât și atașarea de documente.

Atașamente

Fără atașamente

Adaugă atașamente

Think about the role-play during the last class meeting. Write a personal reflection of about 300 words using the following questions as guidelines:

- *What was important for you in this exercise?*
- *How did the role play make you feel?*
- *How did the role play help you (if it did) to prepare for the client meeting? In what ways it did not help you enough?*
- *In view of the role play experience, what do you intend to do related to the client meeting?*

Use these questions as guidelines. Feel free to answer all or some of them, and to add anything else is important for you related to the role play experience and the upcoming client meeting.

Figure 4.4 - Prompt for reflection 1 & English translation

The intermediary and final reflections (third and fifth) followed a different pattern; the questions revolved around the two areas exemplified in Table 4.3.

Sample questions / guidelines (English translation)	Associated concepts
What do you think about the stage of your project? What was helpful? What kind of support do you need?	*Problem-project space*, *cognitive and collaborative tools*, *contextual support* (PjBL concepts)
How was your development as an instructional designer throughout this project?	*Accountability to a joint enterprise*, *mutuality of engagement*, *shared repertoire*, *trajectory* (professional identity concepts)

Table 4.3 - Sample guidelines for reflections 3&5

4.3.4 Focus groups with students

The focus group method involves engaging a small group in a discussion about a specific topic (Wilkinson, 2004), generating a collective, rather than an individual view (Cohen et al, 2007). I chose focus groups initially for practical reasons (see 4.2.3.3) but then decided to make best use of their natural advantages. The interactivity between participants and the naturalistic character of group conversation offer the opportunity to elicit elaborated and authentic accounts, where peers can disagree, challenge, and build on each other's ideas, leading to richer and more elaborated accounts than any single person can provide. Furthermore, since students' projects were done in groups through collaborative work, obtaining their shared perspective was seen as a more authentic approach.

Focus groups were conducted, as shown in Figure 4.1, three weeks after the teams had their meetings with the clients, to give students the opportunity to start working on their projects. My main goals in conducting the focus groups were to find out how students were perceiving their progress and seeing their trajectories as instructional designers in relation to their projects. The starting questions were general, followed by more focused questions. Table 4.4 presents a sample of questions and the concepts investigated. The whole protocol is included in Appendix C.

Sample questions / guidelines (English translation)	Associated concepts
How is your project going? What challenges did you encounter? What is going well? What is not? How can I support you further?	*Problem-project space*, *cognitive and collaborative tools*, *contextual support* (PjBL concepts)
How do you see yourself in the instructional designer role? And compared to the beginning of the course?	*Trajectory* (professional identity concepts)

Table 4.4 - Sample focus group questions and associated concepts

All students were invited to take part in the focus groups. From the first cohort, 8 students participated in the same focus group. From the second cohort, 17 students were scheduled according to their availability in 3 different events of 4, 6, and 7 participants, respectively. The number of participants in each case is within the accepted limits for an effective focus group (Wilkinson, 2004). The focus groups lasted about half an hour each, were audio recorded and I also kept notes.

4.3.5 Semi-structured interviews with clients' representatives

I chose to conduct semi-structured interviews with clients because they accommodate both the need to obtain specific information from all the participants and the need to be flexible and respond to "the emerging worldview of the respondent, and to new ideas about the topic" (Merriam, 1998, p. 74).

These interviews were conducted at the end of the semester, as shown in Figure 4.1, after students presented their final projects. One goal was to investigate the clients' perspectives on the development and results of student projects. Another goal was to elicit their views on students' development between the two meetings. Clients' perspectives are important to provide context for the final presentation, and to offer an additional, external viewpoint, on the students' professional identities.

Table 4.5 presents an overview of the interview questions and their relationship with the examined concepts. The interview protocol is included in Appendix D.

Sample questions (English translation)	Associated concepts
How would you comment on the collaboration with me and the students during this semester? What would you change if we did the project again?	*Problem-project space* (PjBL concepts)
What are your impressions about the students' presentations, compared to your expectations at the beginning? How do you see the students now, compared to the first meeting?	*Trajectory* (professional identity concepts)

Table 4.5 - Sample interview questions and associated concepts

From each participating organization, two to three people were involved in the project, as described in section 4.2.3.2. Group or individual interviews were scheduled based on practical availability, and were audio recorded in all except one case (due to the preferences of the participant) where notes were taken. The individual interviews lasted around 30 minutes, and the group interviews around one hour.

4.3.6 Teacher's journal

Throughout the project, I kept a journal to accompany my involvement in the course and research project and to make my "experiences, opinions, thoughts, and feelings visible and an acknowledged part of the research design" (Ortlipp, 2008, p.703).

I made notes throughout the course, recording each week's main events, my feelings related to them, my plans and expectations, avenues I pursued and how they worked, my interpretations of what happened and the lessons I learned. As part of my reflective practice, as well as serving as an aide-memoire, the journal helped me become aware of my intentions and judgments

as I committed them to the screen, and facilitated an internal dialogue that sometimes led to new perspectives or insights (Bolton, 2010), new actions or change in behaviour (Jasper, 2005).

The journal contains several types of data:

- Factual information about the teaching process, my plans and their implementation, recorded to provide a context to data from other sources and to facilitate recollection of events.
- Reflective commentaries including my feelings, thoughts, expectations, as well as my own subjective interpretation of the teaching events, their meanings and possible consequences.
- Data relating to the research process, which was used as a personal audit-trail, to make explicit and bring into awareness my own subjectivity as an insider researcher, in an effort to enhance the trustworthiness of the research (Jasper, 2005).

The journal was private and I kept it online, using WordPress, in English (see an excerpt in Figure 4.5).

Figure 4.5 - Excerpt from teacher's journal

4.4 Data analysis and reporting

I started data analysis after finishing data collection. To analyse the data, the thematic qualitative text analysis process described by Kuckartz (2014) was used.

In the first phase, I carefully read all the transcribed data in its entirety and made notes of things that I found interesting or relevant. I also wrote a summary of each data sub-set. Data sub-sets refer to data collected using one method, at one stage of the course. Data sub-sets are, for instance, all the responses to the questionnaire, or all students' reflections after the client meeting.

In the second phase, I developed the main thematic categories deductively, starting from the theoretical framework defined in Chapter 2, presented in Figure 4.6.

Set of concepts	Categories	Code
Project-based learning	Problem-project space – representation Problem-project space – context Problem-project space – manipulation Related cases Tools - cognitive Tools - collaboration Contextual support – cognitive Contextual support – metacognitive Contextual support – affective	P-R P-C P-MS P-RC P-CT P-CL P-CSC P-CSM P-CSA
Professional identity in communities of practice	Accountability to a joint enterprise Mutuality of engagement Shared repertoire Trajectory Multi-membership	I-AE I-ME I-SR I-T I-MM

Figure 4.6 - Categories and codes

In the third phase, the first coding process, I coded all the data using the main categories presented above. It should be noted that one passage can refer to multiple categories, within or across frameworks.

In the fourth phase, I retrieved all the text belonging to each category in a table, and moved on to the fifth phase, of defining sub-categories inductively based on the data. Figure 4.7 presents an example of sub-categories defined in NVivo for the category "Accountability to a joint enterprise". More detailed sub-categories were preferred, considering Kuckartz's (2014) warning about the difficulty of including an additional sub-category later in the process.

Figure 4.7 - Sub-categories for Category "Accountability to a joint enterprise"

In the sixth phase, all data was coded using the elaborated coding system including categories and sub-categories.

Finally, in the seventh phase, I presented a category-based analysis of the main categories, while emphasizing at the same time relationships between sub-categories or the categories included in the same set (combining forms of analysis recommended by Kuckartz, 2014).

In Chapter 5, I present categories pertaining to PjBL, and in Chapter 6, categories pertaining to professional identity. While both Chapter 5 and 6 report the data related to categories chronologically as they occurred throughout the stages of the course, in Chapter 5 the presentation is organized around the stages of the course, with relevant categories examined for each stage, whereas in Chapter 6 the main organization is given by categories. I made this choice to facilitate, in Chapter 5, the presentation of the progression of the course – with relevant categories highlighted at each stage, and in Chapter 6, the presentation of how students' professional identity has developed in relation to each of the categories, throughout the course. Then, in Chapter 7, I present connections between categories of the two phenomena after examining the complex relationships revealed by the data, first at the category level (to

determine the presence of a connection), then at sub-category level (to determine the nature of the connection).

4.5 Research ethics

Insider research, particularly research with one's own students, raises complex ethical issues. Being an insider has advantages (Unluer, 2012) such as access and familiarity to the site and activities, but may also raise issues of subjectivity. Considering Mercer's (2007) description of the insider/outsider continuum, my position has both insider characteristics (because I research the course that I also teach), and outsider components (because at the research site I am only an associate lecturer, not part of regular faculty activities and largely unaware of local culture and customs). For my students, I was certainly not as much an insider as most of their teachers; on many occasions I felt they were *more* open in talking to me and less inclined to assume that I knew the ins and outs of their academic life. Regarding my double role of teacher and researcher, unlike Bonner and Tolhurst (2002), I did not try to separate the roles and, as I explained in 4.2.3.3, I tried to embed the data collection methods as much as possible into normal class activities.

Before embarking on the project, I sought approval from the host university. I prepared information sheets, in English and Romanian, for the students and the client organizations, including information about myself as a doctoral student, contact information for myself and my supervisor, the project's aims and procedures related to data collection, storage, analysis and usage in the thesis and in any related articles or presentations. I emphasized the voluntary nature of the participation, the participants' right to anonymity and their right to withdraw from the study at any moment and have their data removed.

Entry negotiations with the client organizations had started four months before the beginning of the semester, and these issues were also discussed with them and were formalized in institutional collaboration agreements signed by representatives of both parties and myself as a teacher and researcher. Individual consent forms were also signed by the clients' representatives

participating in the research. Four of the five organizations, including their representatives, agreed to take part in the research. The fifth organization did not give consent and they virtually withdrew from the project in its early stages. However, one of the students' teams worked on a topic suggested by them, and their data was included in the research.

All supporting documentation, including self-assessment questionnaire, information sheets, consent forms, institutional formal request forms and first interview questions, were submitted for approval to the appropriate Research Ethics Committee at Lancaster University. Initial approval was obtained in February 2013 and an amendment accounting for changes in methods and participants' group was approved in March 2013.

During the first course meeting, I presented my project to the students and distributed the information sheets and the consent forms (see Appendix A). To emphasize that their final grade would not be influenced by the participation in the research, I presented the assessment grid with very detailed indicators of how competence would be measured in the course. I encouraged students to take time to review the information and ask me questions. Before expressing consent, several students wanted to know how much extra time their participation would require. I explained that most data collection would be embedded in the course activities and that they would be invited to participate in maximum two interviews or focus groups during the semester.

During transcription and analysis, the students' data was anonymized and students were assigned numeric codes. Client organizations were assigned codes as well, and their representatives were identified generically as either trainer or manager, instead of their real work titles. Participants' and organizations' names are anonymized throughout the thesis.

4.6 Strengths and weaknesses of the research design

Simons (1996) highlights a paradox of case study research – "[t]he tension between the study of the unique and the need to generalise" (p. 12) – as necessary to enable new ways of seeing and understanding, liberated from

pressures towards the quantifiable. Her comments relate to my motivation for conducting this project (section 1.4), which stems from my multifaceted role as a practitioner of ID, a teacher, and now also a researcher. In undertaking this project, I experienced first-hand the tension between understanding the particularities and context-shaped dynamics of my own practice as a teacher (with the goal of improving it), and creating the kind of knowledge that transcends its immediate application and is potentially useful in other circumstances (such as my industry practice) or to other people in their own circumstances.

The case study methodology, as argued in section 4.2.2, guides the examination of a phenomenon in its natural context, highlighting its various aspects from multiple perspectives and allowing an in-depth analysis of the inter-related elements and their evolution. To improve the trustworthiness of results (Lincoln & Guba, 1985), aspects related to credibility, dependability, transferability, and confirmability were addressed. Some of the key strengths of this project are that it

- draws on multiple sources of data (teacher, students, clients' representatives), uses multiple methods (described in 4.2.3.3), and collects data over two cohorts, allowing for data, methodological, and time triangulation (Denzin, 2017);
- is described in detail, so it provides context to judge transferability;
- investigates an ID course, acknowledging relevant changes in the field's own identity;
- explores possible connections between learning experiences (conceptualized by PjBL) and professional identity development (conceptualized by communities of practice). The goal is not to establish some deterministic, cause and effect relationships, but to understand connections between phenomena as I conceptualize them.

Since all research has limitations and weaknesses, it is a good practice to acknowledge them, describe mitigating measures and possible influences on

the research results. My dual role as a teacher and researcher led to some dilemmas presented below.

Although credibility was addressed using several forms of triangulation, it was not possible to have another researcher analyse the data and compare results. Thus, to increase confirmability, I used reflexivity techniques by writing in my journal how my values and interests were reflected by the ongoing research, and I delayed data analysis until all data was collected and I gained some distance from the teaching process. Ultimately, I acknowledge that my results are limited by what could be observed and analysed by one teacher-researcher, during two instances of the same course.

As explained in sub-section 4.2.3.3, the limited availability of students to participate in meetings additional to the course was a concerning issue. Many students are professionals coming to courses after work. To some extent, I anticipated this issue from my experience with the previous cohort, and I attempted to embed data collection into normal course activities. However, students viewed the workload required by the project as being much higher than expected, so I replaced the planned interviews with focus groups, and supplemented observations and written reflections. Focus groups (sub-section 4.3.4) have both advantages over interviews and disadvantages (some opinions may be left unsaid, and breadth of issues is sometimes sacrificed for depth); I tried to maximize the former and compensate for the latter, by including an additional written individual reflection after the focus group to allow expression of additional opinions. This way, I tried to reflect the reality of the case with its authentic constraints, and designed the research unobtrusively around it, with benefits both for the teaching and the research processes.

Another concern was related to students' possible tendency towards saying what they think the researcher wants to hear. To mitigate this, I embedded data collection in the normal activities of the course, and organized the focus group towards the middle of the course, when students would be more familiar with me as a teacher and thus more comfortable disagreeing with me, and at the same time, more involved in their projects and thus more candid in their answers.

Another decision was to phrase data prompts (focus group questions, reflection instructions) closer to the context of their project, rather than the theoretical framework of my research. Besides not giving hints about the "good" answer for the research, this strategy provides opportunities for the concepts to emerge naturally. Furthermore, to strive to ensure that the findings are shaped by participants more so than by the researcher, my own reflective journal included not only comments about the teaching aspects, but also about the research process, as described in sub-section 4.3.6.

Especially relevant for the transferability of case study results, instead of establishing the representativity of the case as sample, Ruzzene (2011) suggested the concept of *comparability* – how similar the studied case is with other, unstudied, cases. Comparability is not a property of the case itself (as representativity was) but a feature of the study: clear explanations of the factors important to the research results. To improve comparability, I next provide, in Chapter 5, a thorough description of the case, using the detailed theoretical focus of PjBL.

5 Tracing project-based learning

5.1 Introduction

This chapter aims to answer the first research sub-question:

RQ1.1: How are elements of project-based learning manifested in the different stages of the course?

In order to answer this question, I analyse the design of the course and its actual manifestation using the set of concepts related to PjBL defined in section 2.4: problem-project space, related cases, cognitive and collaboration tools, and contextual support.

In section 5.2, I give an overview of the course, its context and evolution from plan to reality, in a blended narrative, aiming to provide a picture of the case, as complete as necessary to situate the analysis and arguments presented in the following sections and chapters.

In section 5.3, I describe briefly the students' previous experience with PjBL, as it emerged from the questionnaire data collected at the beginning of the course.

In sections 5.4 to 5.7, I present, for each stage of the course, the goals and planned activities, as well as the report of their realization, the analysis being guided by the PjBL concepts salient in the sessions. To avoid over-fragmentation of the analysis, I grouped the 14 sessions in four stages, according to the commonality of purpose and activities:

- Stage 1: Introduction and preparatory activities (sessions 1-3) – section 5.4;
- Stage 2: Role-play and client meetings (session 4-5) – section 5.5;
- Stage 3: Design and development activities (sessions 6-12) – section 5.6;
- Stage 4: Preparing and delivering project presentations (sessions 13-14) - section 5.7.

I conclude this chapter with an overview, in section 5.8, of the evolution throughout the course of each of the examined PjBL elements.

By writing this chapter, I aim to contribute to the dependability and transferability of the results, by offering researchers and practitioners enough information about the case to judge the strength of the interpretations and to compare their own stories with mine.

5.2 The course: from plan to reality

As presented in Chapter 1, the course *Blended learning: E-learning applications in training* is offered to first-year master students, during the second semester. The goal of the course is to enable students to design learning solutions incorporating educational technologies.

The students' main task is to act as e-learning providers for real clients and, in teams, to create online learning modules for the particular needs and circumstances of the clients. The projects last the entire semester, with students working in teams of 3 – 4 persons. Four organizations participated in the research, and eleven teams were formed, of which one was involved with a fifth organization that did not consent to participate (as detailed in Chapter 4).

During the previous semester, students attend courses in *Design and assessment of training programmes*, *Human resources training and development*, and *Training methods and techniques*. In the programme design, these are meant to support the courses taught in the second semester. However, I found students struggling with many of the pre-requisite concepts. They also take a concurrent course in *Adult learning*, but since some concepts are needed earlier than they are taught in that course, we often had to cover them separately.

Identifying client organizations and gaining entry started several months before. The client organizations were chosen based on having: a clear learning-related agenda, the organizational capacity to participate in the project, and previous experience with learning technologies. These criteria ensured that the organizations are credible clients, knowledgeable enough to offer valuable

learning opportunities to the students. I discussed with the clients the overall scope of the projects and our own constraints. The students could choose the client and module topic within client constraints. Each organization assigned people to work with the student teams in two roles: content experts, responsible for content-related materials and clarifications, and supervisors, responsible for facilitating alignment between projects and organizational needs. Students met with the clients, at their premises, twice: at the beginning, to establish requirements and constraints, and at the end to present the results. All other communication with the client was mediated by me.

Table 5.1 presents the client organizations and their profiles; the topics selected for the projects and their audiences; the materials provided; and the number of teams involved with each client.

The course meetings are scheduled once a week, for three hours, in the afternoon, to accommodate people coming from work, although the format is of full-time studies. I share the course with a colleague who teaches for two weeks (sessions 8 and 9). For the class activities, I requested a seminar room, with movable furniture, whiteboard, projector and screen and instructed the students to bring their own laptops so they could continue working between classes. However, we were allocated a big lecture hall for the first two hours and a very small computer lab for the next hour. Since this was not suitable, every week we looked for a room to meet or we relocated to a teahouse nearby. We also used various locations in the city for additional meetings, some requested by the students, some in connection with client meetings.

Attendance was a sensitive issue, as students planned to come at only half the meetings – a typical requirement for passing – but realized this was not effective in the PjBL approach. So, they strived to attend as much as they could, but this meant students coming and going continuously during the meetings, making organization difficult and some activities impossible, as more than once, at the end of the class I had a completely different group than at the beginning.

Organization	Organization context	Topic of projects	Initial materials provided by organization	Teams
PD – Public organization	Provides diverse training on public administration, in face-to-face, blended and online formats. Has VLE installed and managed internally.	Micro-learning modules to be published on the website, aimed at educating the general public about aspects of the public function.	Course manual on *Introduction to public administration*	2
PS – Public organization	Prepares future magistrates by one year of face-to-face courses and one year of supervised practice. Is in the process of implementing a VLE and creating content with internal resources.	Online modules for an existing *Personal development* course: body language and non-verbal communication, assertiveness, elements of child psychology, stress management.	Information about the organization Profile of the magistrate Competencies addressed by the *Personal development* course	4
CB – Commercial bank	Is a commercial bank with national coverage. Training department organizes courses for employees on: processes, products, regulations, software applications, and skills, in face-to-face and online formats. Has VLE installed and managed internally, the online courses are created by external contractors and own staff.	Online modules for the *Customer Service* course to be used as pre-work for new employees, follow-up content after the course, or refresher for more experienced employees.	Materials presenting the organization Manual of the *Customer Service* course	1

Organization	Organization context	Topic of projects	Initial materials provided by organization	Teams
CH – Charity	Is a national charity promoting librarianship and information science. Organizes qualification courses in librarianship, only face-to-face. Is involved in a variety of educational projects for librarians and the general public.	Online modules related to a campaign for digital skills for better employment opportunities: using job search engines, creating an online resume, handling an interview using technology.	Information about the campaign	3
Un-named organization	Did not consent to participate in the study.	-	-	1

Table 5.1 - Presentation of client organizations and involvement in projects

As described in Chapter 4, I administered a questionnaire at the beginning of the course to investigate students' experience with technology and PjBL. The results indicate minimal previous exposure to educational technology. Although all 32 respondents reported they frequently use the internet to search for learning materials, only 16 had taken online learning tests, and only 12 had used e-learning platforms. Out of the 12, only two had previously submitted assignments and received feedback online, and only one had previously worked collaboratively online for an assignment. Out of the 32, 26 had not previously used forums to discuss learning-related topics. Given this minimal exposure, I planned to incorporate in the course a lot of support regarding technology use.

One of the goals of the course is to enable students to incorporate technology in their learning interventions, so I judged important to facilitate familiarity with a VLE, by using one in connection with this course. As presented in Chapter 1, I obtained permission to use a VLE reserved for teaching staff. I created a dedicated course space, illustrated in Figure 5.1, with features for sharing resources, submitting assignments, uploading e-learning modules, discussion forums, publishing news, and a shared calendar.

Figure 5.1 - Course screenshot in the VLE

In order to work as instructional designers, students should be familiar with a range of e-learning authoring tools, which are software applications that enable the creation of learning modules incorporating text, images, videos, animations, sound, and interactions (Gaeta et al, 2014), without the need to have programming expertise. Using my practitioner experience, I selected CourseLab[1], an authoring tool with a visual editor, simple to use, free (we had no budget), and with a sufficient range of features, illustrated in Figure 5.2.
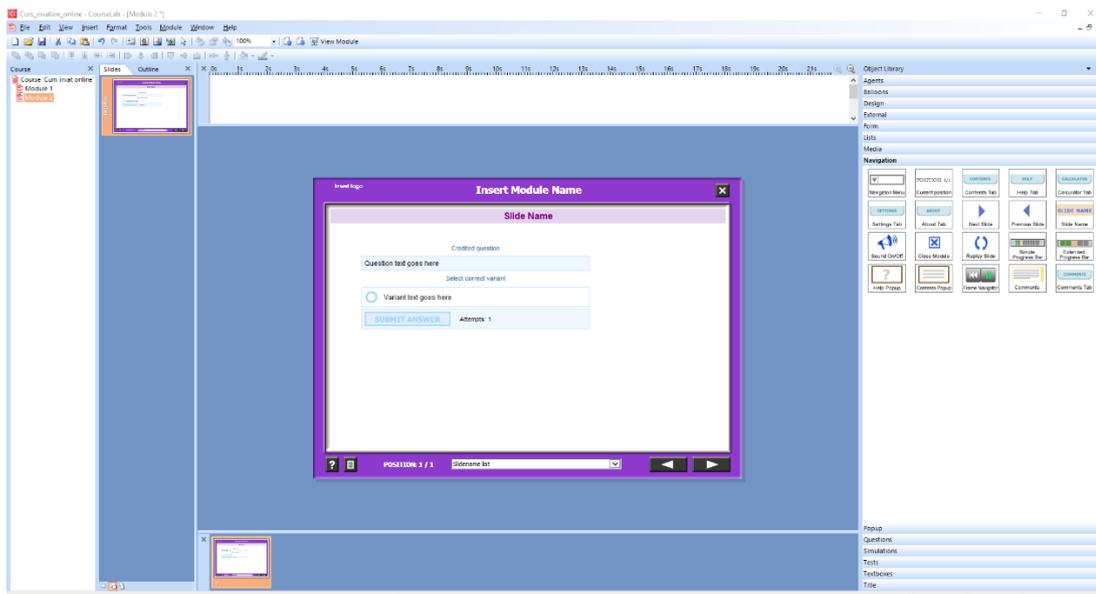
Figure 5.2 - CourseLab screenshot

In addition, I introduced two other authoring tools: Articulate Storyline[2], and BranchTrack[3]. These are professional tools offering either wide or very specialized capabilities. Using trial versions, two teams used them in addition, and instead of CourseLab. Other specialized tools were found by teams to process sound and create infographics and animations.

I communicated with students via an email discussion group and a Facebook group, which each cohort was already using. Direct email communication with each team was also very frequent, making version tracking of the projects very difficult. The forum in the VLE was not used because students preferred the channels they already used.

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[1] www.courselab.com, last accessed March 1, 2016
[2] https://articulate.com/, last accessed June 15, 2018
[3] https://www.branchtrack.com/, last accessed June 15, 2018

In order to help students to organize their work and sustain their motivation, I created a series of weekly mini-assignments. Since requests for extensions abounded, I extended the deadlines repeatedly. The assignments contributed to students' final grades and, after the first feedback and grading, they could redo them (with exceptions) until the end of the semester, when I graded them again.

In guiding the students to work on their projects, I followed the general principles of design and PjBL (see Chapter 2), and I offered contextual support in the form of mini-lectures, explanations, modelling, feedback, questions, and hints. Class meetings were generally dedicated to project work. I gave feedback both on the spot, and by email between sessions. We discussed the feedback, and students asked clarifying questions. I hoped we could set an intermediate feedback session with the clients, but the students' projects came together very late in the course.

Four of the online assignments were set up for reflection purposes, in connection with key events in the course. These written reflections were graded only on formal requirements, such as length, topic, and submission on time, not on content. Another reflection was administered on paper, during the class, and it did not contribute to the final grade.

The assessment strategy allowed students to accumulate points for each mini-assignment, the final product and its presentation. The final product was collectively graded.

Figure 5.3 shows the timeline of activities. Each week (referred as W1 to W14) we held a course session, referred to as S1 to S14 later in this chapter. The diagram also reprises the data collection strategy presented in Chapter 4, to provide a reminder useful for the following data analysis.
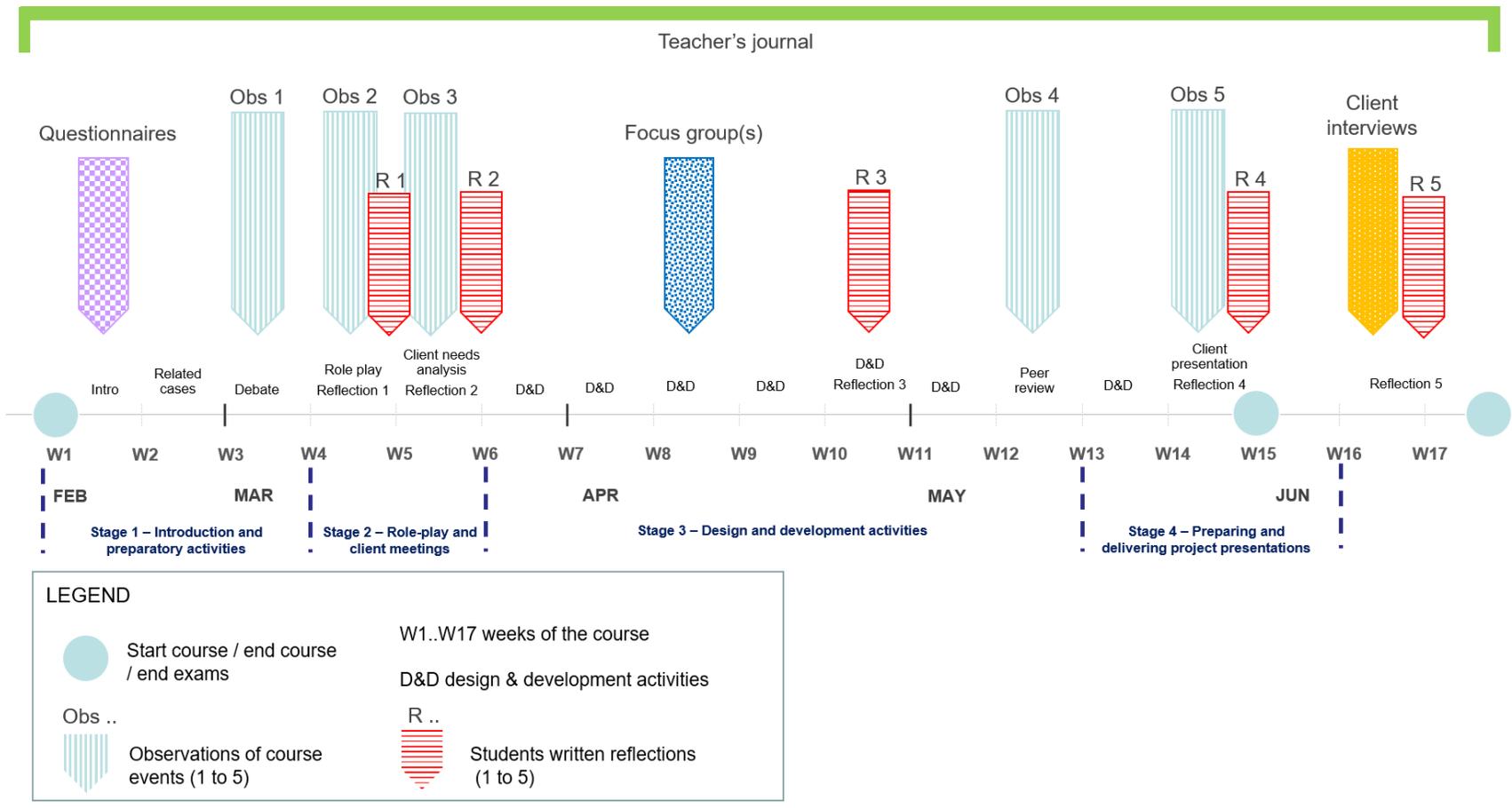
Figure 5.3 - Timeline of activities

5.3 Students' previous experience with PjBL

In the questionnaire administered as a pre-session activity, students declared to have significant experience with PjBL: 9 out of 32 students said they were involved in PjBL very often, and the remaining 23 stated they used it several times. However, the details they offered were not consistent with significant experience.

When asked to give project examples, 14 students did not offer any. Seven students independently gave an example from the same course, describing a step-by-step process applying each week the theory presented in class, by writing a new chapter of a financing proposal; only one of the seven mentioned the topic of their project, and none of them revealed the problem they were trying to solve.

Questionnaire, Student 10 (Q10)	At the course [..] we did a project for the final grade that we started during the first course meeting. At each meeting we learned new information that we included in our project.

Two students gave the example of an inquiry-based project where they researched and presented a course-related topic; one of them mentioned the topic.

Q19	.. we had teams of 6 – 8 students (as far as I remember), each presented a different culture (in our case, Australia). It was very educational, interesting and fun, how we presented the information about that country [..].

Two examples were connected with their respective courses but one dealt with creating lesson projects by pre-service teachers and the other was an unspecified project related to a placement.

Out of the 32 responses, only in 7 cases the topic of the project was explicitly stated, although in 5 of these the information about the connected course was missing. In only one case of the 32 there was an explicit presentation of the problem addressed by the project.

5.4 Stage 1: Introduction and preparatory activities

5.4.1 Goals and planned activities

The goals of sessions 1 to 3 were to introduce students to the domain of e-learning and to the requirements of the course, and to position the course within the general field of training and ID.

It should be noted that information about the students' prior knowledge and experience was unavailable before the first meeting. Based on my experience, I assumed that students' encounters with e-learning (including as learners) were almost non-existent. Table 5.2 shows the activities planned and their intended correspondence with the PjBL elements.

Elements of PjBL (see section 2.4)	Planned activities		
	S1	**S2**	**S3**
Problem-project space	• Introduce the course (Figure 5.4) and the clients.		
Related cases		• Discuss students' previous experience with training delivery and educational technology; • Require students to analyse in groups sample e-learning modules.	
Cognitive and collaboration tools		• Present Google Docs.	• Facilitate a debate format for students to explore their beliefs and arguments about technology and pedagogy.
Contextual support	• Demonstrate VLE features and offer access guidance.		• Offer feedback on their debate arguments.

Table 5.2 - Planned activities Stage 1

After S2, I assigned students the individual task of choosing one content example from the online communities explored in the session, to analyse it in writing and submit the response via the VLE, until the next meeting.
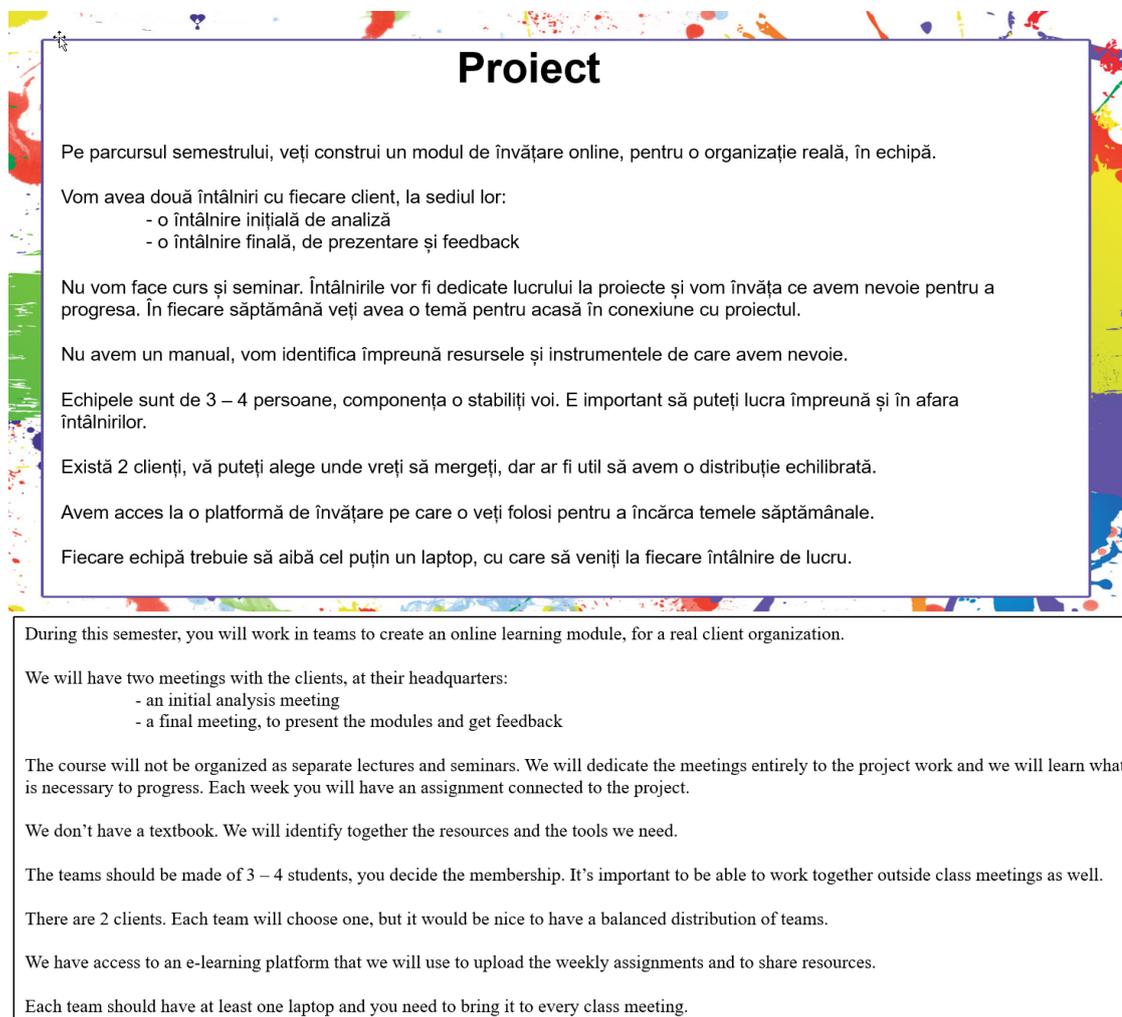
Proiect

Pe parcursul semestrului, veți construi un modul de învățare online, pentru o organizație reală, în echipă.

Vom avea două întâlniri cu fiecare client, la sediul lor:
- o întâlnire inițială de analiză
- o întâlnire finală, de prezentare și feedback

Nu vom face curs și seminar. Întâlnirile vor fi dedicate lucrului la proiecte și vom învăța ce avem nevoie pentru a progresa. În fiecare săptămână veți avea o temă pentru acasă în conexiune cu proiectul.

Nu avem un manual, vom identifica împreună resursele și instrumentele de care avem nevoie.

Echipele sunt de 3 – 4 persoane, componența o stabiliți voi. E important să puteți lucra împreună și în afara întâlnirilor.

Există 2 clienți, vă puteți alege unde vreți să mergeți, dar ar fi util să avem o distribuție echilibrată.

Avem acces la o platformă de învățare pe care o veți folosi pentru a încărca temele săptămânale.

Fiecare echipă trebuie să aibă cel puțin un laptop, cu care să veniți la fiecare întâlnire de lucru.

During this semester, you will work in teams to create an online learning module, for a real client organization.

We will have two meetings with the clients, at their headquarters:
- an initial analysis meeting
- a final meeting, to present the modules and get feedback

The course will not be organized as separate lectures and seminars. We will dedicate the meetings entirely to the project work and we will learn what is necessary to progress. Each week you will have an assignment connected to the project.

We don't have a textbook. We will identify together the resources and the tools we need.

The teams should be made of 3 – 4 students, you decide the membership. It's important to be able to work together outside class meetings as well.

There are 2 clients. Each team will choose one, but it would be nice to have a balanced distribution of teams.

We have access to an e-learning platform that we will use to upload the weekly assignments and to share resources.

Each team should have at least one laptop and you need to bring it to every class meeting.

Figure 5.4 - Project introduction (and translation)

5.4.2 Sessions report

This section presents the findings organized according to PjBL categories (see section 2.4). The data is drawn from questionnaires, observations of the debate and teacher's journal.

5.4.2.1 Problem-project space: context, representation, manipulation

As described in 5.3, questionnaire data shows that students started the course with a limited understanding of what a problem is. The concepts of *context*, *representation* and *manipulation* of the problem refer to, in turn, (see

section 2.4.1) the environment where the problem occurs including people affected by it, how it presents relevant aspects of practice, and how students can manipulate the environment to arrive at a solution.

Out of 18 examples of projects given in the questionnaire, only one mentions a problem and places it in its authentic context. This indicates a weak *representation* of what problems are; projects are seen more as tasks given by teachers and less as endeavours to solve problems experienced in practice. During the two debates (S3, Table 5.2), students showed little awareness of the *context* and they only considered two factors guiding the creation of a technology-based learning solution: some (un-named) pedagogical principles and general expectations. The only evidence of considering situational factors was related to facilitating communication for people who are not comfortable communicating in face-to-face settings, although particular examples were missing.

Debate 1	We don't say not to use technology. Of course, we use it, we are not in the stone age. But what we chose depends on what matches the pedagogical principles.
Debate 2	If you are shy, um…, you can socialize better online, rather than having the pressure of everybody looking at you… plus the trainer…

Students generally showed little consideration of the impact real-world circumstances have on their pursuits; this is reflected in the absence of concrete comments related to such circumstances. The one exception, presented below, shows awareness of the lack of contact with actual professionals.

Q15	What didn't work [in former projects]? The connection with the real world, the lack of specialists working directly with the vulnerable persons (doctors, therapists, forensics). This disrupted the authenticity of the presentations.

When questioned about their upcoming projects, students expressed several concerns, but only two responses are related to the client and the topic of the project, and these deal with general expectations. Similar to seeing a

project as a task given by the teacher, they now see it as a task given by the client.

Q7	I am very curious if we can create something as good as we want, since client expectations are very high.

Regarding the *problem manipulation* space – their own freedom to take action – students seem to want clear goals, tasks and deadlines. When asked about the most important success factors of the PjBL approach, many answers point to good team organization (23) and a clear definition of goals (11).

Q11	What works: to understand the objective of the project, to have a project leader who is responsible to organize all members, time and project parts, each member to understand as well as possible the task/s she has to do.

Although students mentioned concerns regarding contributions of their colleagues, when asked about their own availability, 17 students could not foresee their attendance, due to inflexible working schedules or their own lack of personal organization skills.

Q18	I really hope I can get better organized this semester and not leave everything on the last hundred meters, like I did with this questionnaire, unfortunately...

Only three students mentioned the possibilities for flexibility and autonomy as success factors.

Q15	It works to be able to make your own decisions and orient your own actions; teamwork generated successful ideas in the past.

Out of the 32 students, 13 considered their low self-assessed technical skills an obstacle for the success of the project.

To conclude, in the beginning of the course, students lacked an articulate *representation* of what a problem is, seeing it as a task given by either teachers or clients, could not discern the features of the *context* or their relevance for the

problem, and preferred to be directed, showing little faith in their abilities to *manipulate* the environment.

5.4.2.2 Related cases

The *related cases* are previous or vicarious experience of solving similar problems that the students can draw on for the present problems.

The responses to the questionnaire showed that only 12 of 32 students had used an e-learning platform before and only 1 as a teacher. Only 1 student declared to have previously created e-learning content, but subsequent clarifications revealed it involved uploading documents. Hence, students' experience with online learning was scarce. Given their general work experience was heterogenous in duration and domain, in S2 I changed the original plan and shared some of my experience as a practitioner. We then discussed their experience from other courses, considering how the approaches, constraints and challenges faced by a traditional trainer can be extrapolated to online learning. Given the indications from the questionnaire that students are unfamiliar with problem solving, I used the next planned activity to explore the concepts of problem and context, instead of the more concrete design aspects, as I originally planned. Students analysed sample e-learning modules and tried to speculate about the underlying problems based on the information given. However, they encountered difficulties in articulating problems or imagining connections between issues.

Teacher's journal (after S2)	I showed them two [examples], and explained the context and the problem the designer tried to solve. They seemed to believe that the client tells you exactly what they want, like "I want you to create a scenario with four characters, they say this and that" and all you had to do was develop it [..]. They were totally surprised when I showed the input material on one of my own projects.

Teacher's journal (after S2)	I explained some examples and then asked them to do one or two in class. They chose the one with the mediator, but they could not see the problem. They really did not know what a mediator was, so it was not a very good choice.

To summarize, during the first session, the *related cases* seemed more useful in understanding how a problem and its solution might be conceived, rather than helping with any particular problem.

5.4.2.3 Cognitive and collaboration tools

The *cognitive tools* (described in section 2.4.3.1) are tools that enable learners to construct their knowledge while solving the problem. *Collaboration tools* (see 2.4.3.2) are tools that facilitate interaction between learners.

Regarding *cognitive tools*, during the first three sessions I briefly introduced the individual written reflections and the authoring tools we would be using later.

Regarding *collaboration tools*, almost all students expressed concerns about working in teams due to attendance difficulties. However, they were not very keen on using technology to mediate this issue.

Q6	Virtual project meetings don't work.
Q1	The experience from the first semester proves a reduced collaboration capacity.
Teacher's journal (after S1)	When hearing about the course approach, some students were not overly joyed, as they said not all people pull their weight during the group projects they were involved in before. They tried to persuade me to do the projects individually.

Their working modes seemed to privilege the division of work between team members, although they acknowledged some downsides.

Q12	+: if team members know each other they can split the tasks more efficiently
	-: difficulty in correlating the content from each member

To summarize, students seemed reluctant to work in teams, but if they had to, they preferred face-to-face communication to a virtual one.

5.4.2.4 Contextual support

From the perspective of *contextual support*, defined as affective, cognitive and metacognitive assistance provided to the learners to do things they could not otherwise (Wood et al, 1976), the first three sessions had mainly a diagnostic goal, to reveal potential areas of support.

Students perceived some of the client organizations as being very important and felt pressure to produce a good quality outcome even before meeting the clients. Despite the numerous concerns, they seemed motivated to work for an important client.

Q7	For me, the biggest challenge is to create an e-learning module for an organization that is so important.

The consideration of *affective support* was prompted by the discrepancy between the level of confidence expressed in the questionnaires and the one (much lower) voiced by the students during the first meetings, especially when they saw the sample modules created by the professionals.

Related to *cognitive support*, two areas emerged. First, students expressed many concerns regarding their ability to use technology, so I incorporated short activities in the first meetings to practice using the VLE.

Q8	[there are] technological barriers – the incapacity to assimilate in such a short time all the skills related to the necessary technology.
Q23	I am not very good with technology… so this is a challenge for me – to get used to what we do here.

Second, during the debates and the related cases analyses, students showed a preference for asking yes/no questions; when answering, they were reluctant to commit to one side, resorting to "it depends", however without elaborating on what or how. Their arguments were generic, showing a need for support in articulating their opinions and developing their arguments.

Debate 1	How does a trainer choose technology? He uses pedagogic principles, doesn't he?
Debate 1	Do you think technology helps the trainer? Um, no [rephrases] Do you think the trainer should ignore it?

In terms of *metacognitive support*, there was a more explicit area of self-regulation support, given the students' concerns about their time management skills, and a less obvious one, related to their difficulty of expressing and examining their beliefs, revealed by the debate. Students showed difficulties in considering multiple perspectives (given the choice, no students would have supported technology over pedagogy, not even as an exploration exercise).

To conclude, the *contextual support* needs identified span across *affective* aspects (to deal with the pressure of a real-life client), to *cognitive* aspects (related to technology use, but also to articulating and examining arguments), to *metacognitive* aspects (self-regulation of learning and being aware of one's own biases and beliefs).

5.5 Stage 2: Role-plays and client meetings

5.5.1 Goals and planned activities

The aim of S4 was to prepare students for the upcoming client meetings through four role-plays, each student taking part in one. The clients were played by volunteering students who were free to choose a familiar industry. They were instructed to give an introduction into the situation, but not to offer specific information unless asked.

There was no formal class meeting in week 5. Instead, S5 consisted of a 30 minutes discussion before the client meeting to review the plan with each team, and 30 minutes after the meeting to discuss next steps and provide a

quick feedback. The client meetings took place at their premises and lasted one to two hours. The meetings before and after were held at convenient locations nearby. Goals and planned activities are presented in Table 5.3.

Elements of PjBL	Planned activities	
	S4	S5 & Client meetings
Problem-project space	Role-plays with unscripted client briefs (see Figures 5.5 and 5.6).	Client meetings to explore problem, context and constraints.
Contextual support	During role-play: diagnostic of support needs. After each role-play: debrief and support as necessary.	During client meetings: diagnostic of support needs, affective and metacognitive support. After each client meeting: debrief and support as necessary.

Table 5.3 - Planned activities Stage 2

Figures 5.5 and 5.6 present the client's and consultants' brief for S4, and their English translations. The client's brief was not scripted, meaning that students could customize their role according to their experience.

Instrucțiuni client

Sunteți Coordonator de training / Director HR / General Manager într-o companie cu mai mult de 200 de angajați care interacționează cu clientul, distribuiți în toată țara. Alegeți un domeniu cu care sunteți familiarizați (de exemplu: telecom, auto, retail, financiar). Căutați un furnizor de training. Ați avut deja o scurtă discuție telefonică cu un consultant și acum vă veți întâlni cu ei ca să explorați abordări și să le dați informații pe baza cărora să vă poată face o propunere și o cotație. Oferiți informații generale despre companie, situația dvs și așteptările pe care le aveți. Concentrați-vă pe o arie legată de vânzări, management, customer service. Evitați ariile prea specializate. Nu oferiți informații specifice decât dacă sunteți întrebat direct. Una din problemele pe care le aveți este formarea unui număr mare de angajați fără a întrerupe business-ul.

Aveți 10 minute de pregătire. Folosiți-le pentru a stabili și nota următoarele:

- Domeniul (putei alege și un nume pentru companie dacă doriți)

- Informații despre companie (locație, scurt istoric, obiective)

- Problema curentă (ce vreți să îi învățați pe angajați să facă și nu pot face acum)

Fiți politicos și răspundeți la întrebări cu sinceritate. Nu ascundeți informații, dar nici nu le oferiți fără să fie cerute.

Client brief:

You are the Training Coordinator / HR Director / General Manager of a company with more than 200 client-facing employees spread in multiple locations. Choose an industry you are familiar with (for instance: telecom, automotive, retail, financial). You are looking for a training provider. You already had a brief phone discussion with the consultants and now you meet them to explore approaches and give them information so they can make a proposal and quotation for the project. Offer them a general presentation about the company, your situation and your expectations. Focus on an area related to sales, general management or customer service. Avoid specialized topics. Don't provide specific information unless directly asked. One of your concerns is training a large number of employees while not disrupting the business.

You have 10 minutes to prepare. Use them to determine and make notes of:

- Your industry (you can also choose a name for your company if you want)

- The details of the company (business location, brief history, business goals)

- Current problem (what it is that you want employees to be able to do and they cannot do it now)

Be polite and answer the questions truthfully. Don't withhold information, but don't overshare either.

Figure 5.5 - Client's brief & translation

Instrucțiuni consultant

Sunteți consultanți într-o firma care oferă soluții blended learning. Unul din colegii voștri a avut o scurtă discuție telefonica cu un potențial client, dar azi nu va putea fi prezent. Știți doar că se interesează de o soluție pentru mulți angajați distribuiți în toată țara. Probabil vor lua în considerare și componente e-learning.

Aveți 10 minute de pregătire. Folosiți-le pentru a nota întrebări despre:

- Companie și angajații vizați
- Problema pe care vor să o rezolve (ce ar trebui sa fie angajații capabili să facă)
- Constrângerile pe care le au

Stabiliți modul de lucru în echipă. Ascultați cu atenție, luați notițe, formulați o linie de întrebări și nu vă aventurați să propuneți soluții prematur! Încercați să înțelegeți problema mai întâi.

Consultants' brief:

You are training consultants providing blended learning solutions. One of your colleagues had a brief discussion with the client over the phone, but she will not be able to join you today. You know they are looking for a training solution for many employees distributed around the country. It is likely that e-learning will be considered.

You have 10 minutes to prepare. Use them to write down questions about:

- *The company and the targeted employees*
- *The problem they want to solve (what it is the employees should be able to do)*
- *The constraints they have*

Decide how you will act as a team. Listen carefully, make notes, ask follow-up questions and don't venture a premature solution! Try to understand the problem first.

Figure 5.6 - Consultants' brief & translation

I asked the students to submit in the VLE a written reflection regarding their participation in the role-play (Figure 5.7) and another one after the client meeting (Figure 5.8).

Think about the role-play during the last class meeting. Write a personal reflection of about 300 words using the following questions as guidelines:

• What was important for you in this exercise?

• How did the role play make you feel?

• How did the role play help you (if it did) to prepare for the client meeting? In what ways it did not help you enough?

• In view of the role play experience, what do you intend to do related to the client meeting?

Use these questions as guidelines. Feel free to answer all or some of them, and to add anything else is important for you related to the role play experience and the upcoming client meeting.

Figure 5.7 - Reflection 1 & translation

Think about the client meeting. Write a personal reflection of about 300 words using the following questions as guidelines:

- How did the client meeting meet your expectations? Did you find out everything you wanted to know?
- What was surprising (if anything) in the client meeting?
- How did you feel during the meeting and how do you feel now?
- Is there anything you would do differently if given the chance?
- What are your plans after the client meeting?

Use these questions as guidelines. Feel free to answer all or some of them, and to add anything else is important for you related to the client meeting.

Figure 5.8 - Reflection 2 & translation

5.5.2 Sessions report

To prepare for the role-play in S4, students needed more time than predicted. In two cases, the students played the actual organizations they were going to meet.

During the four client meetings, the clients displayed a range of approaches: some prepared structured presentations and adopted a more directive approach, while others expected the students to lead the discussion and find a solution together. In the latter cases, I intervened to narrow down the options considering constraints and feasibility.

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5.5.2.1 Problem-project space: context, representation, manipulation

5.5.2.1.1 Problem context

During the role-plays in S4, the students, "clients" and "consultants" alike, showed low understanding and interest in presenting or exploring the *context* of the organization. Although the "clients" were free to choose industries they felt comfortable with, they either provided little detail to their colleagues, or offered confusing accounts. There was one exception, where the "client" actually worked in the domain and offered a wealth of information, leaving "consultants" with little else to ask.

The discussion and written reflections after the role-plays showed an increased awareness about understanding the clients and the beneficiaries compared to previous sessions, although awareness of the organizational context remained very low.

Reflection 1 Student 19 (Reflection 1-19)	I think we should consider, or at least reflect on the perspective we have on the training programme, we are often trapped by thinking "the others are like me", at least I had an aha moment ... it got me thinking.

The actual client meetings proved important in assisting the students to grasp the context of their projects. Many of them admitted in the written reflections to have approached the organizations with preconceptions. Some realized they had a very limited understanding of how things work in the domains of their client organizations.

Reflection 2-4	An important thing for me during today's meeting was to realize the many preconceptions that I have regarding the people working in public institutions, although I did not know many things about this.
Reflection 2-19	...I felt a bit reluctant when I first entered the building because I had preconceptions about the "mighty world of magistrates" but slowly, as discussions progressed, I realized we need to do something because they need not only specific competencies, but also transversal competencies...

Reflection 2-29	Surprizing today is that I found out new things about librarians. I really thought all they do is manage the book inventory and recommend books to people.
Reflection 2-30	Generally speaking, the security level was something new for me, but the real surprise was when I saw the place where we had the meeting – it did not fit at all with what I expected – it was surely a pleasant surprise!

An important aspect that provided context for the students was visiting and interacting with clients at their own working places, as opposed to me handing them a brief with the same information.

In summary, while context awareness started at low levels in the role-plays, it increased in the following reflections, and students showed openness to investigate the context during client meetings. Meeting the clients at their premises helped them confront some of their preconceptions.

5.5.2.1.2 Problem representation

During the role-plays, students explored the problems to a very small extent. Most of their questions were closed and dealt with logistic aspects of rather low relevance.

Role-play 3, Student-consultant	So, 1000 employees. And where do they work? In urban, or rural areas?
	Where are they? Near Bucharest? Give us some examples of cities, so we can see how much…
	So, what is their work schedule? From… Their working hours?

Although, in one case, the "client's" definition of the problem obviously puzzled "consultants", they did not try to clarify it until the very end of the meeting, after discussing various aspects without a clear context.

Role-play 3	Student-consultant (CO): Can you elaborate what are your expectations for the training programme? Student-client (CL): I want to increase sales by 15% in the next 4 years… CO: (hesitant)... Um, ok, and how, exactly? I mean I understood that you want… that you expect…

After the role-plays, when asked, students said they discovered everything they wanted to know, despite all the four role-plays being less than ideal.

Teachers' journal (after S4)	They were very charged emotionally, especially the first group. The girls were frustrated with the client. I asked what they wanted to find out and didn't - they said they got answers to all their questions. When I replied that they did not ask all their questions, they became defensive and blamed the client's attitude.

However, their position became more nuanced in the written reflection, where several students acknowledged the problems and made explicit what they would have done differently.

Reflection 1-20	Looking back, a lot of questions come to mind – for instance, about the target group, it's not actually "everybody".
Reflection 1-5	We did not understand what was going on, we got confused. I am deeply frustrated because we don't know how to make a needs analysis.

Moving on to the actual client meetings, in two situations the client proposed well-researched problems, with descriptions of beneficiaries. In these cases, students focused on understanding better the context, and made clear plans for further investigations.

Reflection 2-15	I guess we asked few questions, because everything that we prepared was covered. I am glad we had the role-play before, we got clear expectations from the meeting, so we can concentrate on understanding, not on collecting information. Otherwise, we would have been a little lost.

In the other two meetings, the problems were more open, leaving the students space to find their own interests. However, not being familiar with the domains and not having any previous experience made it difficult for students at that point to move the discussion further, so I intervened to narrow the field.

Following the meetings, all teams made plans to investigate the problems further; the plans had clearer purposes than what they previously suggested in the role-plays. Students involved with PS went to observe the trainees' seminars and open court sessions to understand how the judges interact with the parties. "Mystery client" investigations were conducted by students involved in the CB project to see customer service skills in action. Students involved with CH visited public libraries to find out what kind of advice they might get from facilitators, and students from the PD project talked to people around them about interactions with public administration.

Reflection 2-1	I think it is important to attend one or two court sessions so we can see them in action and understand them better. Perhaps maybe to discuss with someone to show us what they would have been interested to know when they were in training.

In conclusion, students found it difficult to arrive to a well-defined *representation* of the problem, unless it was clearly presented to them. However, their awareness of some of the aspects of the problems increased (they became able to see there was a problem) and so did their willingness to investigate the problem and its context further.

During the role-plays, in the two cases where students played the actual organizations involved, e-learning was assumed to be a part of the solution. In the other two cases, where students selected seemingly more familiar domains, the e-learning component was forgotten, or considered as an afterthought.

Role-play 2	CO: So, for 470 people, we can come, we took projects in different cities before... It's only that I would like to know how to split the team, in case we don't consider an online cooperation. Let's see how many team leaders there are and how they are split between the three cities.

Apart from trying to establish meetings with more stakeholders, students did not discuss how they would collect or process the information further. This is, however, not surprising, since they did not have a clear definition of the problem.

During the actual client meetings, students were more concerned about understanding the problem and the beneficiaries and did not discuss what types of solutions they will be considering. They took notes of the clients' requirements for the solution, but did not comment on options. Some of them asked if they could validate their intermediate ideas directly with the clients and it was established that I will be mediating any intermediary validation. After the meeting, two of the students started to investigate various authoring tools and wrote to me about possible approaches to creating a solution.

In conclusion, with some exceptions, students were still working on understanding the problems and their contexts, so *manipulating* the problem was not yet a priority for most of them.

5.5.2.2 Contextual support

The role-plays revealed many areas in which students needed support: in understanding a problem, its context, and identifying constraints and opportunities in creating a solution. During the first role-play, I contemplated the

idea to stop it, give feedback and start again. Instead, I decided to continue and treat whatever happens as a learning opportunity.

Teachers' journal (after S4)	I felt a bit disconcerted because I thought they lack so much knowledge, it will not be possible to understand anything from the clients and the whole thing would be a fiasco. But then I decided that we work with the material that we have and if they are far behind where I think they should be, then that's where they are and we should go from there.

One issue revealed by the role-plays was a lack of general business understanding which made it difficult to both inquire into a problem and imagine the situation where one would arise. In addition to that, students' questions were generally closed, not being very helpful in gathering useful information. I decided to focus on the latter problem and, after giving them feedback on this point, we tried to formulate open-ended questions to help reveal more information.

What is interesting is that, in their reflections, although many students acknowledged the difficulties they had in the role-plays, their confidence levels were high. The only action point on their agenda was to conduct a better research into the clients' background before the meeting, although more concrete details were not present.

Reflection 1-32	After this preparatory session, I feel much more confident to go to a face-to-face meeting with the client.
Teacher's journal (after S4)	I feel confused. I read their reflections after the role-play and they are all very confident and feel very prepared for the client meeting. I don't know if this is a good thing (that they are not discouraged) or a bad thing (that they are not aware they are far from prepared).

During the client meetings, students showed more availability to explore through open questions, although they were directed at exploring the context, not the problem itself. Following the meetings, the teams planned and conducted their own investigations.

In conclusion, *contextual support* was directed towards helping students develop questioning skills, as well as providing feedback to help them become aware of their own level of preparation and keep a balance between being overly-confident or overly-worried.

5.6 Stage 3: Design and development activities

5.6.1 Goals and planned activities

The aim of sessions 6 to 12 was to facilitate students' work on their projects, in teams. I planned to start each class by a short demonstration of specific features of the main authoring tool, followed by teams working on their projects with assistance as needed. The meeting time was not dedicated to comprehensive feedback, which I planned to give via email. Sessions 8 and 9 were held by my colleague (unrelated to this research), but during those weeks I met with the teams requiring support. Students would also submit in the VLE problem definitions and design outlines at specific deadlines.

The original plan was to hold the peer-review session during week 7. However, projects were not moving along quickly enough, so I postponed it until week 12. The peer-review exercise had a double aim: first, to infuse students' projects with outside ideas from their colleagues, and second, to stimulate the completion of the projects. The former goal is linked to the design concepts of *critique* and *design precedents*, detailed in section 2.2. Table 5.4 presents the planned activities for sessions 6 – 12 in connections with elements of PjBL.

Elements of PjBL	Planned activities	
	S6 - S11	**S12**
Problem-project space	Students would design their solutions.	Peer-review exercise
Related cases		
Cognitive and collaboration tools	Students would use authoring tools to create the modules.	
Contextual support	Demonstration of authoring tools features. Offering support as requested by students.	Offering support as requested by students.

Table 5.4 - Planned activities Stage 3

The prompt for reflection 3 is presented in Figure 5.9.

Reflecție

Ce părere aveți despre stadiul proiectului vostru?

Ce v-a ajutat până acum? De ce fel de suport mai aveti nevoie?

Cum lucrați cu colegii de echipă?

Ce aspecte sunt importante pentru voi în procesul de a deveni instructional designer?

Cum vă vedeți în acest rol de instructional designer?

What do you think about the stage of your project?

What was helpful so far? What kind of support do you need?

How are you working with your team mates?

What aspects were important for you in becoming an instructional designer?

How do you see yourself in this role?

Figure 5.9 - Reflection 3 & translation

The procedure of the peer-review exercise is presented in Figure 5.10.
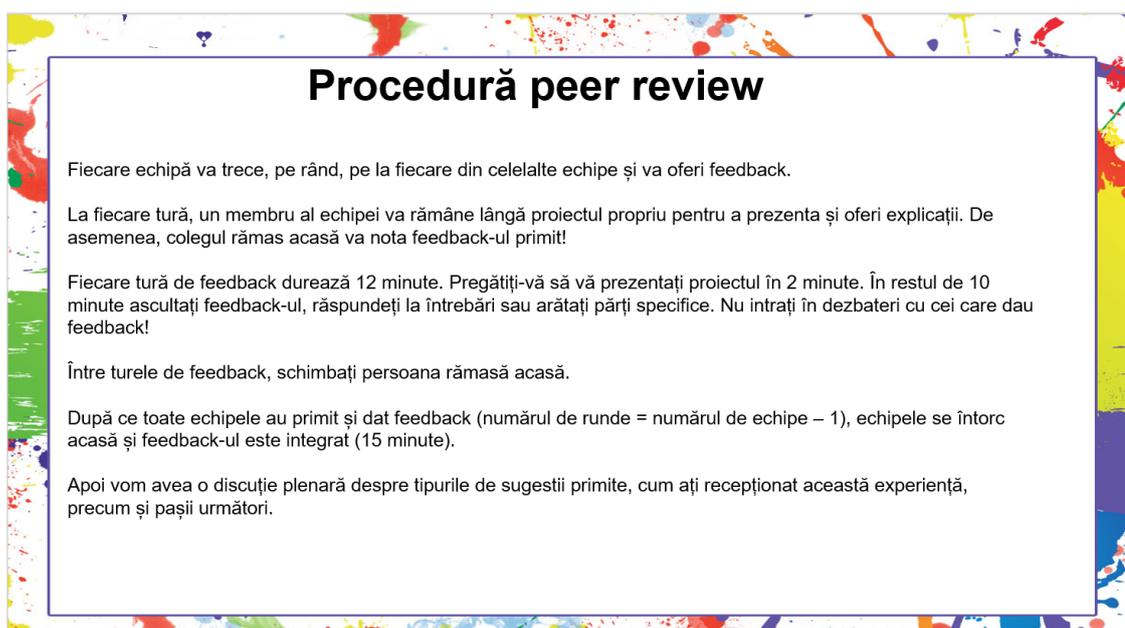
Procedură peer review

Fiecare echipă va trece, pe rând, pe la fiecare din celelalte echipe și va oferi feedback.

La fiecare tură, un membru al echipei va rămâne lângă proiectul propriu pentru a prezenta și oferi explicații. De asemenea, colegul rămas acasă va nota feedback-ul primit!

Fiecare tură de feedback durează 12 minute. Pregătiți-vă să vă prezentați proiectul în 2 minute. În restul de 10 minute ascultați feedback-ul, răspundeți la întrebări sau arătați părți specifice. Nu intrați în dezbateri cu cei care dau feedback!

Între turele de feedback, schimbați persoana rămasă acasă.

După ce toate echipele au primit și dat feedback (numărul de runde = numărul de echipe – 1), echipele se întorc acasă și feedback-ul este integrat (15 minute).

Apoi vom avea o discuție plenară despre tipurile de sugestii primite, cum ați recepționat această experiență, precum și pașii următori.

Every team will visit each of the other teams to offer feedback.

In every round, a member of the team will stay by the project as the host, to present it and offer clarifications. In addition, the host will write down the feedback received.

Each feedback round lasts 12 minutes. Prepare to present your project in 2 minutes. In the remaining 10 minutes, listen to the feedback, answer questions or show specific parts of the project. Don't argue with the feedback givers!

There will be a different host for each round.

After all the teams gave and received feedback (number of rounds = number of teams – 1), all the teams return home and integrate the feedback received (15 minutes).

Then we will discuss the types of suggestions you received, how the exercise was experienced, as well as the next steps.

Figure 5.10 - Peer-review instructions & translation

5.6.2 Sessions report

Until S11, no team formally submitted problem definitions or design outlines. Some of them sent me by email or showed me in class draft documents.

During S12, in the feedback integration phase (see Figure 5.10), students asked their colleagues for additional explanations. We discussed what feedback was expected and what was surprising, how to decide what to implement, and what value they derived from the peer-review. I found this

session very difficult to organize and facilitate alone, especially given the small size of the room and the closeness of the teams' stations.

5.6.2.1 Problem-project space: context, representation, manipulation

Sessions 6 to 12 emphasized the *problem manipulation* aspect in two ways: first, related to the balance between freedom and guidance, and second, linked to students' opportunity to trial their modules with their peers.

The first aspect is the balance between the freedom and guidance students had in working on their solutions. Out of 11 teams, only 2 chose to use different authoring tools from the one recommended. Each team could choose its own approach to the module, but for many teams, the approach was not clarified until the end of the semester, and for some, not even then. Most teams made frequent requests for specific – mostly technical – support, but they did not ask for stricter guidelines. In fact, many teams seemed more confident than I thought they should be, and in many occasions, I was the one dealing with the uncertainty of their projects.

Teacher's journal (after S11)	In the beginning, I tried to be very comprehensive in my feedback, to cover everything. But it took so much time and it was disappointing to see they did not implement it. [..] But what they had or had not implemented was beyond me and I could not keep track of that.

The second aspect concerns the presentation to their colleagues during the peer-review session, which can be seen as their first opportunity to test their solutions on others. Despite instructions, the students were very defensive initially, offering excuses for every comment received. After I intervened, they seemed to be more receptive, but since their projects were not finished, they placed all the suggestions on a potential to-do list, and were less inclined to interpret them as a reflection on work already done. The biggest benefits in this respect were that they realized how much more they still need to do, and, as one student summarized, it is "Better to have something small and good, rather than cover a lot".

In conclusion, students were willing to experiment with the creation of solutions, although not from a technical perspective; this freedom placed the responsibility on them, which led to considerable delays. In this respect, the peer-review session worked as a wake-up call regarding the deadlines, as well as an inspiration to what kinds of problem *manipulations* can be considered.

5.6.2.2 Related cases

The peer-review session provided students with the opportunity to see how their colleagues dealt with similar issues. They were surprised to see how different the projects were, both in instructional approaches, and regarding technical solutions. However, the two aspects seemed to have opposite effects: while the variety of the educational choices made by the other teams provided inspiration and ideas ready to be implemented, the variety of authoring tools made it difficult for students to understand the other projects enough to be useful for them. They showed interest in the unfamiliar tools, but did not consider adopting any of them in their projects.

Teacher's journal (after S12)	All in all, everybody said it was useful, and they got plenty of ideas, not necessarily from receiving feedback, but from seeing other teams' projects.
	People were more interested in the technicalities of [one particular] project so I don't think [that team] got useful feedback. It was more like a consulting session they were giving on the tools they used.

In conclusion, the peer-review session worked to provide access to *related cases*, but the technical aspect impacted negatively both the quality of feedback some teams received and the capacity of their solutions to work as a related case.

5.6.2.3 Cognitive and collaboration tools

During this period, teams were evolving in one of two ways: making considerable progress, or making very little progress.

There were five teams who made significant progress, by starting to use the authoring tools to implement their ideas even before week 6, asking for feedback and specific support, using all the templates provided (although they did not submit anything), requesting meetings during weeks 8 and 9, and adjusting their plan continuously; not everything was smooth, there were obstacles, but those tended to be very concrete. Regarding the use of tools, they were willing to try every tool that was available, decided together if it's helpful and how it should be used.

Reflection 3-14	Being present in class was very important because here we clarified together many of the issues with the VLE and the [authoring] tool.
Focus group 3 (FG3)	It seems difficult in the beginning [..] The first time I looked at BranchTrack my head was in chaos, but then you start to work and discuss and see how much you can do…
FG1	I liked Articulate a lot. [..] I find out what it can do and my team mates work on the design. We meet and I show them what is possible, so they won't ask for space rockets.

This is how we work. We discuss, he does the technical part, but we all know what is there, he comes with ideas, we do it together. Different things, but together. |

The six teams who were still struggling did not have a clear definition of their ideas, did not request extra meetings, and returned in week 10 with no plans and many generic complaints about the lack of time, the difficulty of the tool and the low engagement of their teammates.

Reflection 3-23	We did not meet since before Easter, we did not manage to have a clear plan…
FG1	If we were all here from the beginning, we could have gotten better organized... Like this, one comes, one goes, it's hello, goodbye… You wait and wait and think the other will do it, but the deadline comes and there's nothing.

Reflection 3-4	I don't know these things... If I studied computers, maybe I could have... But like that, it's a lot of information, everything is new... We need more time…

In conclusion, although all students expressed a preference for face-to-face meetings, and most of them had extra commitments, some of the teams used all the cognitive and collaboration tools available, experimented with them and adapted to the circumstances, while the other teams made very little progress until the peer-review in S12.

5.6.2.4 Contextual support

Students appreciated both elements designed to offer contextual support: setting intermediary tasks with clear deadlines, and offering feedback and guidance along the way.

Regarding the first aspect, students mentioned the small, frequent tasks, as a significant support. However, apart from the first two tasks (which were not directly related to their projects), they barely submitted the required documents for the project-related tasks. By probing more during the focus groups, it appeared that students considered the reflection tasks to be the most useful, helping them regulate their efforts, and providing motivational support, even if not much work had been done otherwise. The peer-review activity in S12 served the same purpose, to help students become aware of the stage their project is on, compared with their colleagues and course expectations.

FG4	Step by step, feasible tasks, small tasks and the ones on the platform, and... if we did not have the platform, or tried CourseLab and BranchTrack... Working with them helped me loads! Example and exercise! Strict deadlines!
FG1	What helped me most was the small tasks, that I could use to think about my project and go back ... see my experience and make sense of it. So, we had to re-evaluate it and see what needs to change…

Ongoing feedback and guidance for each individual project was very appreciated by the students, who were more accustomed to being evaluated solely at the end of the semester. Although I expected that feedback-giving would be a time-consuming activity, I was not prepared for the amount of feedback the students requested. While seeing it as useful, students also believed that feedback creates higher expectations and raises the challenge.

FG1	You were always there to answer our questions! Even when they were stupid questions!
	The expectations (in other courses) are generally here [shows a low level] and I want to be here [shows a high level]. If you don't give feedback, I'm not interested. There are classes that I can just cruise. A bit of effort at the end and no problem. This course is good, it challenges us. Even if we don't like it and we complain like little children! [laughs]
Reflection 3-5	What helped me most was the support of the teacher, the feedback and her patience and tolerance, and also the fact that we had access to the materials at all times.
Teacher's journal (after S12)	Team [A] sent me their draft module the night before the course with the expectation that I would review it on the spot so they can implement changes tomorrow. They are like the thirsty who cannot stop drinking. I need to contain this.

To summarize, *contextual support* in the form of setting intermediate tasks with deadlines helped the students orient and regulate their efforts, and giving feedback kept them motivated and helped them to progress.

5.7 Stage 4: Preparing and delivering project presentations

5.7.1 Goals and planned activities

The aims of S13 were to make final changes to the projects and prepare for the client presentation by dividing airtime between team members, reviewing good practice on presentations and performing final technical checks.

The client presentations were organized at the clients' headquarters, in separate meetings when more teams worked for the same client. I planned to hold post-presentation half-hour debriefs. The aim of S14 was to present to the client the resulting online modules and to receive feedback. Table 5.5 presents the planned activities.

Elements of PjBL	Planned activities	
	S13	**S14**
Problem-project space		Teams would present their modules to the client.
Cognitive and collaboration tools		
Contextual support	Offer support to prepare the presentation.	Offer support as needed during and after the presentation to the client.

Table 5.5 - Planned activities Stage 4

I also planned two reflection tasks to be submitted in the VLE: one regarding students' experience of the client presentation (Figure 5.11) and one regarding their overall project approach and what it meant for their development as instructional designers (Figure 5.12).

Reflect on the client presentation. Write a personal reflection of at least 300 words using the following questions as a guide:

- How did you prepare and to what extent it was helpful?
- How did the suggested structure help you prepare?
- How do you think the client received your presentation?
- What do you think went well in your own presentation? How about in your team's?
- What would you do differently if you had the chance?
- What was surprising in the feedback you received?
- What was valuable in the feedback you received?

You can add anything else you think it's important about the client meeting.

Figure 5.11 - Reflection 4 & translation

Reflect, writing at least 300 words, about the way you worked during this project and the impact on your development as instructional designer.
Cover the following elements:

• How did you get organized in your team
• What was your role in the team (compared to wanted role, and how you accomplished your role)
• How did you communicate with your team mates
• What obstacles did you face as a team and how did you overcome them (if you did) or what are your suggestions (even if not implemented)
• How was your development as an instructional designer throughout this project (how did you change during the course)

Important: this task is awarded 3 points if you answer all the questions above. The points are not awarded based on the content of your answers (you don't need to say that everything was great to get the points).

Figure 5.12 - Reflection 5 & translation

5.7.2 Sessions report

Students organized their presentations according to their development strategy. Teams that decided together the general design and then distributed the development of the sub-topics chose to distribute the presentation accordingly. Other teams worked together on all the modules, without a clear division; they divided the presentations based on topic preference and confidence in presenting.

Similar to the first meeting, some of the clients organized a more formal meeting, while others kept things informal. Feedback was given to the students after the presentation. In one case the client requested to see the modules in advance so they can prepare. In another case, feedback was given while they were presenting; although this is reflective of real life, it can be disruptive for students, so I asked the client to postpone the remarks until the end. Outside the requirements of the course, the students promised to incorporate the feedback and deliver an improved version to the client.

5.7.2.1 Problem-project space: context, representation, manipulation

Presenting the modules to the clients serves the purpose of testing the solution against expectations and seeing how it performs, which is part of the problem manipulation space described in section 2.4.1.3.

What is interesting is that different students found surprising the positive and the negative feedback, the general and the specific one. This seems contradictory, but it points out that students may have not known what to expect. Besides getting specific suggestions, presenting to the clients and observing their reactions led students to see that multiple stakeholders may have conflicting demands, as well as understanding what they could do (usually in the form of "should have done") to perform better next time.

Reflection 4-34	I think our presentation was received differently by the two client representatives: the manager saw potential and a small beginning for a useful project, while the practitioner analysed, saw the strengths and weaknesses and made notes of many ideas I think for his own reference in the future.
Reflection 4-33	To improve the presentation, I would do a trial run with people that I don't know. With questions and answers.

The clients' interviews emphasized that all teams were on a right path towards a solution. Some projects were closer to a final form than others, but

generally clients were impressed that students invested time into understanding their activity and creating customized content.

| Interview CB | It really showed they were trying to impress us with all the interactive activities they included, even if the red thread was missing. They put a lot of effort into it. |
| Interview PS | I was really impressed with the professionalism with which most of them approached the projects. You could see they were nervous, but they held it together and were not put off by the questions or our comments. |

After each client meeting, at the debrief, students looked energized by the encounter and eager to implement the modification requested to produce a final version.

| Teacher's journal (after S14) | What was frustrating was that, every time, after the client meeting, they kind of wished they had put in more work. They were generally pleased with the reception they got, but most of the feedback was not surprising, it was things they could have done, and in that moment, they clearly regretted not having done it, to get an even better reaction. |

To conclude, presenting to the actual client was a significant part of *manipulating* the problem because it allowed students to discover unanticipated situations, to perceive reception nuances not otherwise visible, and to plan how to perform better next time. Interestingly, the actual feedback received from the client was probably the least important element, as most of it was already known by the students.

5.7.2.2 Cognitive and collaboration tools

Many students favoured face-to-face meetings in class or team-organized over other types of communication.

Reflection 5-36	Because we all worked during the week, we met in the weekends at the house of one of us to work of the project in optimum circumstances.
Reflection 5-32	We tried to work virtually, but it was better face-to-face.

Some teams used Google Drive or Dropbox, but their comments indicate that it was mostly used as a repository of intermediate work that all the team members could access. Many students used e-mail to communicate within the teams; some set up Google Groups.

Reflection 5-5	We created an account on Dropbox, but we did not get to work together. Everyone did his part, we integrated them and that was all.
Reflection 5-13	To communicate easier, she created a Google Group. There was our meeting space, we sent e-mails, asked for feedback, etc.
Reflection 5-14	We kept one another informed; when someone couldn't make it, we would send an email with the meeting minutes and with very clear next steps.

5.7.2.3 Contextual support

Generally, students found the guidelines for preparing the presentation very useful, although not all the teams used them and one team said having a suggested structure "stifles their creativity". Many students indicated they would have liked dedicated time to rehearse the presentation, and some indeed had done that in private meetings.

Reflection 4-3	The thought of presenting to such a large audience, students and teachers of [PS], was scary, but we tried to forget about our nerves, and focus, and for this we needed a few rehearsals. [..] Regarding the structure our teacher proposed, it was very useful because we had so many ideas about the topic [..]

However, during S13, students did not have a presentation ready to be rehearsed, and some teams did not even have a completed module to present.

Teachers' journal (after S13)	I really hope that [team X] will pull together and do all the things they promised to do. [..] They promise and promise and I hope they understand they cannot present promises... But if they do, or they are not ready, this will be a lesson that I am not going to save them from.

As the presentation approached, students entered into their role as consultants, needing less affective support and appreciating more frank critical feedback.

Reflection 4-17	[..] It was also valuable the feedback of the lady who told us openly where and what to modify, without holding back, because the purpose is to learn from it, not to stroke our hair.

Although clients appreciated the students' efforts, all of them indicated they would have liked to offer intermediary feedback.

Interview CH	But they could have asked us for examples! If I'd seen this a month ago, I could have told them how this happens, they could have visited us and perhaps spent some time here…
Interview CB	Yes, what they did was nice but now it feels like a first meeting to discuss a draft that we could have had some time ago.

In students' final reflections, the most prominent challenge was related to the difficulties of working together in teams, managing the role allocation, and planning their effort. Some attributed the success of their teams to finding the right person "who complements you perfectly" (Reflection 5-4).

In conclusion, the contextual support of providing structure was appreciated by the students, but they also needed opportunities to rehearse

their presentations and improve their teamwork. The clients also expressed their willingness to offer more feedback to the students.

5.8 Overview of the approach

Using the PjBL elements described in Chapter 2, I summarize in Table 5.6 how their manifestation evolved during the stages of the course, before moving to analyse in Chapter 6 how elements of students' professional identities evolved throughout the course.

Course stage	Problem-project space	Related cases	Cognitive and collaboration tools	Contextual support
1	Students • lacked an articulate *representation* of what a problem is, seeing it as a task given by teachers or clients, • could not discern the features of the *context* or their relevance, • preferred to be directed, showing little faith in their abilities to *manipulate* the environment.	• the *related cases* helped students understand how a problem and its solution might be conceived.	• students were reluctant to work *collaboratively* in teams, and preferred face-to-face to virtual communication.	*Contextual support* needs identified: • *affective* (deal with pressure of a real-life client), • *cognitive* (related to technology use, articulating and examining arguments), • *metacognitive* (self-regulation of learning and being aware of one's own beliefs).
2	• *context* awareness started at low levels in the role-plays, but increased after reflections and client meeting, together with their openness to investigate it; • students found it difficult to arrive to a well-defined *representation* of the problem, but awareness of its existence and willingness to investigate it increased. • *manipulating* the problem was not yet a priority for most students.			*Contextual support* was directed towards: • helping students develop questioning skills, • awareness of their own level of preparation and keeping a balance between being overly-confident and overly-worried.

Course stage	Problem-project space	Related cases	Cognitive and collaboration tools	Contextual support
3	• students were willing to experiment with the creation of solutions; • the peer-review session reminded them of the deadline, and provided inspiration regarding problem *manipulations*.	• the peer-review session provided access to *related cases*, • the technical aspect impacted negatively both the quality of feedback received and the capacity of some solutions to work as related cases.	• The more successful teams experimented with all the *cognitive and collaboration tools* available and adapted to the circumstances, • other teams used only the required tool in a limited way.	• *contextual support* in the form of setting intermediate tasks with deadlines helped the students regulate their efforts, • giving feedback kept them motivated and helped them to progress.
4	• presenting to actual clients allowed students to test their solutions.		• Students collaborated much better for the presentation than they did for the creation of the modules. • They used the templates and tools suggested.	• Providing structure was appreciated by the students, • Students needed opportunities to rehearse their presentations. • The clients expressed their willingness to offer intermediary feedback to the students.

Table 5.6 - PjBL analysis summary

6 Development of students' professional identity

6.1 Introduction

This chapter aims to answer the second research sub-question:

RQ1.2: To what extent are elements of students' professional identity developed in different stages of the course?

In order to answer in this question, I examine the evidence for the development of students' professional identity throughout the course, using concepts related to professional identity as defined by the CoP framework (detailed in section 2.3): dimensions of identity (accountability to a joint enterprise, mutuality of engagement, shared repertoire), trajectories, and multi-membership.

As a member of the ID community, I tried to define my expectations in relation to each of the professional identity concepts examined. These expectations are not a different set of goals from what I presented previously; rather they are my interpretations of the course goals viewed from the lens of professional identity as defined by the CoP framework. I acknowledge the fact that they are heavily influenced by my own experience as an instructional designer in the practice settings in which I developed as a professional. Other professionals and other communities may have different interpretations and goals.

These goals, summarized in Table 6.1, are aligned both with my personal experience and motivation, detailed in section 1.2, and with developments in the ID field, detailed in section 1.6.

Professional identity concept	Related goal
Accountability to a joint enterprise	The students' joint enterprise should be to create a solution that accommodates diverse constraints and requirements, coming from the context, the client, learners, teacher and students.
Mutuality of engagement	The students should work in teams, at least partially together, not just split the work; discuss ideas, get mutually inspired, not just convince one another.
Shared repertoire	Students should use ID terminology, and become familiar with authoring tools and e-learning platforms, as well as specific procedures such as using precedents, reflection-in-action, peer review, and iterative improvements.
Trajectory	Students should experience, even in a peripheral way, what being an instructional designer means.
Multi-membership	Students should consider the influence between their different memberships.

Table 6.1 – Goals related to professional identity

Using the theoretical concepts and the related goals to analyse the unfolding of the course is important in understanding how the elements of the course contributed (or not) to the achievement of these goals and hence, how students' professional identity was shaped by this course. The findings presented in this chapter will be later combined with the findings related to elements of project-based learning (presented in Chapter 5); the themes emerging from this interconnection will be presented and discussed in Chapter 7.

Sections 6.2 to 6.4 present the evolution of the course through the lens of dimensions of identity (accountability to a joint enterprise, mutuality of engagement, shared repertoire), trajectory and multi-membership. When each concept is first discussed, a brief definition is provided for the reader, as well as a reference to the detailed presentation of the concept in Chapter 2.

This chapter ends with section 6.5, where I present an overview of students' professional identity development throughout the stages of the course.

6.2 Dimensions of identity

6.2.1 Accountability to a joint enterprise

As explained in section 2.3.1.1, *accountability to a joint enterprise* refers to feeling responsible to achieve a purpose (a joint enterprise) that is shared by community members. The joint enterprise comprises official goals of the practice, but also goals created by each community in the course of its practice. Being accountable involves aligning behaviour with these goals and being able to explain the alignment.

Table 6.2 presents an overview of the findings related to the students' *accountability to a joint enterprise*, starting with my goal, as a teacher, and following with the evolution of the dimension over the four course stages. Placing the teacher goal in the first position does not mean the teacher perspective is privileged; rather, it reflects the fact that the course design was constructed before the first session.

Goal	Students should create a solution that accommodates diverse constraints and requirements, coming from the context, the client, beneficiaries, teacher and students.
Stage 1	Students felt accountable to the teacher's requirements; they wanted to apply the rules to pass the course, and few of them considered the professional implications.
Stage 2	Students attempted to reconcile their own and the clients' concerns during the role-plays, but it was the actual client meeting that shaped their joint enterprise.
Stage 3	Students started to differentiate the client requirements from those of beneficiaries. They considered explicitly their accountability, by reflecting on differences between being a trainer and being a designer.
Stage 4	Students wanted to meet clients' needs and appreciated the clients' approval and feedback. They started to see contradictions between different sets of requirements and began searching for their own positions.

Table 6.2 - Accountability to a joint enterprise - overview

6.2.1.1 Stage 1: Introduction and preparatory activities

Students started with a fuzzy view about the relevance of the course to their future profession, and their joint enterprise seemed to be passing the course, as revealed by their answers to the questionnaire: only seven out of 32 students linked the course with their future professional activity, while the other 25 students referred exclusively to requirements or fears related to passing the course.

During the debates, the students declared their responsibility to apply "pedagogic principles", transmitting "correct information" (Debate 1, see sub-section 5.4.2.1), and keeping the learners motivated. However, they struggled to conceive how technology might enter into this mix.

Debate 1	Besides, the learners are more motivated and more involved when they see you are using technology that is ... um... modern. Especially young learners don't want to see dusty methods and trainers who read from sheets.

6.2.1.2 Stage 2: Role-play and client meetings

The students' views became more nuanced after the role-plays and even more so after the client meetings. During the role-plays, students tried to make sense of their own position and goals as consultants. This process encountered difficulties, but it raised students' awareness about the various sources of requirements involved.

Reflection 1-5	Not knowing exactly what our role will be in this project, what we should and can do, it was difficult to position ourselves in the right way. [..] We lack the precise understanding of the type of relationship, hence our confusion in approaching our partners.

After meeting the clients, students' reflections showed an increased clarity of what is expected of them. Interestingly, what impressed them the most

was the clients' professional attitude and investment in the projects, as shown below.

Reflection 2-7	An important idea that stuck was that people there are very professional and they expect us to be the same. Just as engaged and serious in all the work we're going to do for them.

At this point, both sources of accountability – the clients' requirements and their own position as consultants – were clarified by meeting the client: the former explicitly, by what the clients asked of them, and the latter implicitly, by the clients' attitudes which the students wanted to emulate.

6.2.1.3 Stage 3: Design and development activities

During the focus groups, students made the distinction between designing for face-to-face settings and designing online courses, emphasizing a more deliberate approach of the latter, which points towards a heightened sense of accountability.

FG1	.. there [in the face-to-face training] we have other methods, it's easier, you adapt on the spot... Here [in the online module] it seems like you have to predict everything before, every mistake has a big impact, I mean if you think they will like it, and they don't and don't learn anything and shut down the computer...

In the written reflections, students expressed their accountability towards building a solution that would respond to the clients' requirements and to the beneficiaries' learning needs. However, in many cases, responding to clients' requirements meant following their instructions, and responding to beneficiaries' needs – delivering "pleasant, easier to digest" information (Reflection 3-13).

Reflection 3-18	The module we create... I hope it will be appreciated because it implements all / most of the client's instructions.

Only three students considered other sources of accountability, such as balancing the requirements with the possibilities of the online environment, and being true to your own, or your team's, design ideas.

Reflection 3-15	We should try and suggest to the client something that is close to what can be done in the virtual environment, to negotiate as much as possible the constraints of the project.

6.2.1.4 Stage 4: Preparing and delivering project presentations

With the presentation dates set, many students were quite nervous whether their products will be liked by the clients. However, the projects were well received and students felt their effort was valued. The suggestions for improvement were welcomed by the students, even when given in a frank way.

Reflection 4-17	I liked to see that our work and engagement were noticed and our vision was appreciated. It was also valuable the feedback of the lady who told us openly where and what to modify, without holding back, because the purpose is to learn from it, not to stroke our hair.

In two cases, students encountered contradictions between what they perceived as the needs of the target group, and the clients' expectations.

Reflection 4-1	[the client] said that this was stated in the initial discussion and I interpreted this as a criticism regarding the inclusion of the topic. At the seminar and after the discussion with the trainer and some of the participants, assertive communication seemed like a topic worth including.
Reflection 4-34	What surprised me in the feedback was the comments about the case studies. Personally, I think the situations we included are very close to reality, and the learner could relate to that, but the suggestions are more towards artificial situations, just to make a point.

At the beginning, students were accountable to the joint enterprise of passing the course by following the rules. As they progressed through the course, they started to see this is not a straightforward process and different views should be reconciled and incorporated. The client was viewed as the most prominent source of requirements. Students tried to add their own perspective as consultants, but were unsure of it, so again the client acted as a model of a professional. During module development, some students started to realize that not all requirements can be accommodated and some negotiation is needed. At the end of the course, after the final presentation, students were reassured to see their work was valued; at the same time, some of them became aware of additional conflicts between requirements. Overall, my assessment as a teacher, regarding the achievement of the initial goal, is that students made valuable steps, but unfortunately the process stopped at the end of the semester, and the students could not work further to make sense of the conflicts and contradictions they became aware of.

6.2.2 Mutuality of engagement

As described in section 2.3.1.2, *mutuality of engagement* refers to the particular ways members of a community interact with each other.

Table 6.3 presents my goal, as a teacher, in relation to this professional identity dimension, followed by an overview of the findings related to the students' *mutuality of engagement*, as it evolved over the four course stages.

Goal	The students should work in teams, at least partially together, not just split the work; discuss ideas, get mutually inspired, not just impose ideas on one another.
Stage 1	Students were reluctant to get involved and tried to avoid working together. When they had to form teams, they split the work.
Stage 2	Students changed their involvement from hesitant and problematic during role-plays, to enthusiastic and immersed during and after the client meeting, which was seen as a reference point of professional behaviour.

Stage 3	The enthusiasm and direction gained previously was only maintained for the teams who met regularly in person. The peer-review session provided a boost for the teams lagging behind.
Stage 4	Students privileged face-to-face interactions. They appreciated the feedback from clients and the fact that it was given to them as professionals and not solely as students. After the presentations, they considered the impact of their way of engagement.

Table 6.3 - Mutuality of engagement - overview

6.2.2.1 Stage 1

Students' time to participate in the course seemed very limited; 15 out of 32 students declared in the questionnaires that work commitments will likely prevent them from attending.

Q9	I will need a lot of understanding from my bosses to get to as many courses as I can.

Although students agreed that teamwork is reflective of real projects, they expressed significant reserve about working together and tried to persuade me to let them work alone or in pairs, showing little sense of mutuality. For them, working in teams meant splitting the work, so the difficulties come from integrating the parts, or when someone does not do their part.

Q1	The first semester experience demonstrated a reduced capability to work in teams.

Only one student mentioned advantages that teamwork can bring to the project.

Q7	…we learn to be more effective when we work together. We practice patience, empathy, tolerance, acceptance of others' opinions and decisions.

6.2.2.2 Stage 2

During the role-plays, students' engagement was hesitant and problematic, which was also seen in their written reflections, where they noted

difficulties with reconciling different perspectives, less involved colleagues, unclear roles; moreover, students also expressed awareness of how their own engagement drops when things are difficult.

Reflection 1-1	I noticed, with surprise, a certain shyness in me related to the colleagues that represented the client.
Reflection 1-19	The exercise was difficult, the questions are the proof (here we could have intervened somehow, but we didn't).
Reflection 1-20	We did not involve the others in the conversation, although we had the example of the previous team who did just that.

After meeting the client, students became more engaged and made concrete plans to discuss, in teams, the information received regarding topics, and to pursue further the analysis by getting to know their beneficiaries better. Seeing the clients so engaged with the projects helped the students position themselves as consultants and wanting to be just as professional as their clients.

Teacher's journal (after S5)	They almost don't look like the same students. They were so energized when we talked outside after the meeting, I had trouble getting them to keep their voices down 'cause I was afraid we might be overheard. Even during the meeting, I noticed they stood straighter, measured their words and overall really tried to make a good impression. […] It was funny that the client gave them pretty much the same information as I did before, but now it's real. It has come from an official person, in an official room, it was like they really heard it this time, and now they are more real than before.

6.2.2.3 Stage 3

During these sessions, five of the teams managed to meet and make progress with their projects, while the other six did not. Meeting in person and

being present in class seemed to make a difference; although all teams began by splitting the tasks, some of the more successful teams started to realize that working together has more advantages.

FG 2	Maybe the different background is a good thing and it develops you and takes the project to another level, one that you did not expect at the beginning and none of the persons could anticipate.
Reflection 3-23	We have many details to set, and we did not even manage to meet and do the first part, to get our ideas together…
Reflection 3-29	It was ok that each of us contributed with something; we discussed first to see what are we comfortable with. For the design, all three of us participated, which was more than useful because, starting from an idea about an exercise or how to do a layout, step by step each said what she thinks, if it's ok, if it should be changed, and we got to a result that was satisfying for all of us.

However, during the peer-review in S12, all the students were equally engaged, even the ones who could only show a few screens. Seeing the stage of the other projects, as well as having to present their own ideas made students feel like they are part of a successful community, and motivated them to step up their game.

Peer review, during debrief	Student: Now there's no excuse... I know we skipped a few (laughs...) a lot of meetings, but we have good ideas... and we can do what they (points at the others) did! I wish my teammates could have seen this!

6.2.2.4 Stage 4

After presenting their modules to the clients, the students analysed the impact of their engagement. Apart from the time issues that made meetings difficult, they noted the challenges of working with colleagues who have different styles or views.

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Reflection 4-17	The situations like: where is the slide number x were embarrassing and proved the weak communication in our team. And even if we worked so much on this project, in the end we just tripped over ourselves.
Reflection 5-11	As our little project was born, we learned from each other, we listened to each other, we took turns to lead, there were moments when a supervisor was needed, everybody wanted to check the status, we managed to mobilize each other, we gave each other feedback.

Regardless of their differences, though, when faced with the client, even the teams with intermediary stages projects made a considerable effort to have a put-together presentation. Clearly, the students were quite accustomed to presenting, although so far mostly to faculty.

Teacher's journal (after S14)	There were teams that I expected to be well prepared and they were, but there were other teams that completely surprised me and if I only heard their presentation, I would have been impressed and convinced they put in a lot of work.

Students appreciated the feedback and interpreted being treated as equals as a confirmation of their new status as consultants.

Reflection 4-3	They pointed what was missing in a very constructive manner […], this shows they don't think of themselves as above us.

Clients appreciated the teamwork but also noticed some slips.

Interview PS	We didn't get to see them working together, but we saw them presenting and supporting each other. It is a pity that some of them presented alone, without their colleagues, and you could tell which parts they were most familiar with, and with which parts they weren't.

Interview PG	You could see where the teams were united and which teams had issues.

6.2.2.5 Conclusion

Although my initial goal of having students create a solution together by discussing and collaboratively constructing their ideas was only partially realized, students had progressed from disengagement with this course (due to lack of familiarity with technology and perceived lack of capability) and unwillingness of working together, to increased levels of engagement which were however sustained mostly for those who made the effort to meet. Regardless of their success in working together or their overall engagement, both the peer review and the client feedback provided students with renewed enthusiasm, which unfortunately could not be utilized fully because the course ended.

6.2.3 Shared repertoire

As presented in section 2.3.1.3, a *shared repertoire* refers to the artefacts (authoring tools and VLE in our case), language (such as ID terminology) and procedures (such as peer review, reflection-in-action, etc.) used by a community. The goal related to this dimension of identity as well as an overview of the findings are included in Table 6.4 below.

Goal	Students should use ID terminology, and become familiar with authoring tools and e-learning platforms, as well as specific procedures such as using precedents, reflection-in-action, peer review, and iterative improvements.
Stage 1	Due to little previous exposure to educational technology, students' repertoire only includes general pedagogical knowledge and a view of technology in a supporting role, without the ability to influence the course design.
Stage 2	Students' use of questioning techniques was ineffective in the role-plays, but they committed to more complex investigations after the client meeting. There are some occurrences of reflection-in-action.
Stage 3	Students approach towards the tools seemed mediated by their engagement in the project. Incorporating feedback and developing iteratively proved difficult. The peer-review process was partly effective.
Stage 4	The tools mediated some of the communication. Students acknowledge the need to have better prepared their explanations and reasoning.

Table 6.4 - Shared repertoire - overview

6.2.3.1 Stage 1

Students started the course having little experience with learning technologies; only two students (of 32) had previously attended online courses, the others' experience was mainly limited to downloading materials from the internet. Regarding the specific language of ID, the terminology they used sometimes showed confusions between terms. As evidenced below, they anticipate having difficulties with the technical part.

Q9	It is a big challenge to learn using an online platform.
Q6	It will be difficult to use tools to create the platform and to make it interactive and attractive.

Regarding procedures, as part of the shared repertoire, most students expressed the opinion, exemplified below, that technology plays a supporting role, being a later-step decision influencing only the implementation of the course design, but not the design itself. The examples they gave of using technology were limited to few options, as evidenced below.

Debate 1	I am not saying we should go back to the blackboard and chalk, um..., but I'm saying that the trainer, depending on how he structures the content and the exercises he wants to do, um..., he chooses the technology he needs.
Debate 1	What we choose is according to pedagogical principles. So, for instance, we want to exemplify something, we show a short movie, like the one with the resistance to change, if I want to present information, I show a PowerPoint and then I send it by email, too. I can even have them do an online test at the end, to see what they learned.

During the first sessions, the students mainly developed their awareness of the repertoire rather than using it.

6.2.3.2 Stage 2

Regarding the initial goal presented in Table 6.4, these sessions were especially important for developing reflection-in-action, a reflective conversation with the situation (see section 2.2), which as a teacher I thought should help students, at this point, better understand the problem and its context. Given the scarce understanding students showed of the concept of a *problem* (also discussed in section 5.4.2.1), their questions during the role-play were mainly closed and unconnected; they asked many questions but did not follow up even when the answers were completely unhelpful.

Role-play 1	CO: Ok, so what is the budget for the course?
	CL: 140 [Romanian currency] / day.
	CO: And you plan to organize a bid?

Contrary to views expressed right after the role-play, in the reflections students admitted being unsatisfied with the results and with being unable to adapt their questioning technique when things became difficult, indicating awareness they cannot yet use this element of the repertoire.

Reflection 1-29	I sensed we are not on the same wavelength but I didn't know what we needed to do, what should our approach be to reach common ground.
Reflection 1-31	We were too focused on our questions and we missed helpful details offered by the client.

In the client meetings, the students had no opportunities to act on their realizations, because the clients offered almost all information without being prompted. Although some students reported in the reflections a discrepancy between what the client expected and what they felt able to provide, none tried to negotiate. All the teams committed to investigate the situation further by connecting with the beneficiaries. Only two reflections include fragments of conversations with the situation which can be construed as incipient forms of reflection-in-action.

Reflection 2-20	[..]In fact, I think this is a sore point – however great we present the information, how do we get it to the right people? [..] Young people spend more time online – but I doubt they will start out of the blue to search info about the public service. Shall we look for forums that discuss the topic (or that complain about X from the financial administration)?

6.2.3.3 Stage 3

During these sessions, the main focus was on tools and the peer-review. Regarding tools, the teams who showed more engagement (see section 6.2.2) experimented with other authoring tools besides CourseLab, and decided to either not use them, use them in addition to CourseLab, or replace it altogether.

FG1	It's cool that we can use different tools. CourseLab is a little weak and it's not reliable, it gets stuck. I loved Articulate [another tool] a lot! I like it that we can work with real tools, that are actually used by professionals!

On the contrary, the teams who did not meet as much and made slower progress tended to view CourseLab as "the new" PowerPoint, and proposed to replace it in other contexts outside the course, not necessarily suitable.

FG3	We are used with PowerPoint, which is very simple. [..] (The authoring tool) helps you at work because you need to make some explanations, some presentations and you don't do it in PowerPoint like everybody else, you come with something innovative, different…

The e-learning platform was used by students mostly to submit assignments and have access to the materials used during the sessions. Although some complained about difficulties, they agreed it was a useful experience.

Reflection 3-14	Using an e-learning platform helps me to use better my time, to work from home, to save time, to have access to more information without the cost of socializing.

However, the students who accessed the VLE more were the same people who also met more in person.

Teacher's journal (after S10)	People who meet are the same people who use the platform. People who don't show up, or can't contribute to their team, they are also not submitting their assignments, don't read the materials, don't share anything.

Regarding the procedures included in their shared repertoire, receiving and incorporating feedback was one of them. During these weeks, I invited students to submit intermediary versions of their modules, so they can receive feedback. Most of the teams did this, some even multiple times. However, a lot of the feedback was not implemented and I found myself giving it repeatedly. Subsequent versions were generally more complete, rather than significantly improved.

Teacher's journal (after S11)	The first thing I noticed was that they [..] created all their slides as master slides. I explained how it should be done and they said it will be corrected. However, it wasn't. [..]

The focus of the peer-review session was giving and receiving feedback. When giving feedback, students were not quick to criticize and judge. They pointed out what they saw as positives and they asked a lot of questions; some questions addressed the content and others focused on how it was done. At the receiving end, students behaved apprehensively whenever asked to justify their decisions. Some even replied "Because this is how I like it!" During the debrief, they realized that their reasoning should be incorporated in the product they create, otherwise audiences can't understand it.

Teacher's journal (after S12)	[…] they were really curious to see other projects and to ask questions, like why did you do that, and how did you do it, and what tool did you use? They were in a bubble with their own project and now they can get out and see the world. Of course, there were projects online all the time, but these are real projects, by real people they know, which are in the same situation as them.
Peer-review, during debrief	Now I know that some things are in your head and you think it's obvious, but then comes [a colleague] with her questions and you realize it's invisible, people don't see inside your head… So maybe teachers don't as well (laughs), we have to make it really easy for them! (as an afterthought) Oh... and for the learners!

6.2.3.4 Stage 4

In preparation for their presentation to the client, teams tried to integrate what each member had created separately. During their work together, students relied on meeting face-to-face, exchanged information on the email; some teams mentioned using other tools: Google Groups, Google Drive, Skype, Dropbox, but this was not the norm.

In their reflections after presenting to the client, students acknowledged that sometimes, the reasoning underpinning their design decisions was not obvious to the client, and it was not easy for them to explain. Many emphasized the importance of having a rehearsal presentation and showing their module to people not involved in its development.

Reflection 4-17	Beyond the challenges of CourseLab, the biggest challenge was when we had to articulate the things that we tinkered on for so long. To explain every picture, background thought, decision to use a certain method…

6.2.3.5 Conclusion

Regarding my goal stated in Table 6.4, I believe this course was a useful experience for the students, who started with little understanding about educational technology and about the problem-solving process. Mastery of terminology, as well as familiarity with various authoring tools were variable among students, but sufficient, in my opinion, to make this experience a useful precedent for future similar endeavours. In relation to that, it can be noted that procedures specific to design were less effectively practiced by students. Precedents were not used as intended (except partly during the peer-review), reflection-in-action was sparsely encountered, and developing a capability to do iterative improvements was interrupted as it was gaining momentum. Peer review seems to be the one procedure that worked, in the sense that students treated their colleagues' designs as precedents, but the limited timeframe hindered its contribution to iterative improvements.

6.3 Trajectory

As detailed in section 2.3.2, *trajectory* refers to the way one's identity changes in relation to a CoP, in this case the ID community in which I am a member. Table 6.4 details my goal and the findings in relation to this concept; findings about trajectories were derived directly from data or by analysing changes in the previous three dimensions.

Goal	Students should experience, even in a peripheral way, what being an instructional designer means in a professional setting.
Stage 1	Students were reluctant to engage in the course due to self-perceived lack of abilities and lack of trust in educational technologies.
Stage 2	Students trajectories became more defined, motivated by the professional models provided by the clients.
Stage 3	Students' trajectories are peripheral; some of them are open to future developments and may continue on this path, whereas others are only involved for the duration of the course.
Stage 4	Few students see themselves doing ID after graduation. Nevertheless, most students appreciated the experience and realized the relevance of ID and educational technologies in the job of a trainer.

Table 6.5 - Trajectory - overview

6.3.1 Stage 1

Although students want to become trainers, educational technology is not something they want to be involved with. Their comments indicate reticence towards this course which they perceive as being remote from their knowledge and abilities. Their reserve is motivated by anticipated difficulties to deal with technology, and by their scepticism about online learning. This sentiment was not unanimous; some students expressed enthusiasm for the course and a belief in its usefulness for their future training career.

Q23	I am not good with technology... so this will be difficult – to get used to what we do here.
Q21	For me, a big challenge is whether the target group of the training we design will actually have a real authentic learning experience [using an online course].
Q25	I personally want to learn how to create e-learning or at least blended learning platforms that I can use when I will deliver training sessions. I want very much to become a trainer and I am aware that this course is really useful.

6.3.2 Stage 2

The role-plays in S4 and the subsequent reflection took the students out of their comfort zone, leading to increased openness towards technology and its effectiveness.

Reflection 1-5	..every domain has procedures and rules that can be transformed into an e-learning course[…] Instead of fighting this trend, we could take an active role and embrace the new technologies.
Reflection 1-28	You really can have a learning process without a trainer in front of you. I even said out loud what are the advantages and disadvantages of face-to-face learning (which I thought had only positive aspects).

Although students were still confused about the project and their role, their engagement changed substantially after meeting the client. They became aware of their own preconceptions and limited understanding of contexts, were impressed by the client representatives' professional attitudes, and wanted to raise to the clients' implicit or explicit expectations of professionalism, as it was explained in sections 6.2.1 and 6.2.2 about changes in their *accountability to a joint enterprise* and *mutual engagement*, respectively.

6.3.3 Stage 3

After working for a few weeks on their projects, the enthusiasm built by the client meeting became more nuanced. Two students used the project to develop their interest in educational technology and were definitely seeing themselves in this role in the future. Other students expressed their intention to avoid it in their future work. The majority of students' views fell somewhere in between. Moreover, all students stopped considering the technology as a separate, optional part of their future profession, and became interested in the learning opportunities that technology can afford.

FG1	At the beginning, I didn't see myself in this. The link between being a trainer and technology was unclear to me! [..] Besides, it seemed very difficult! (researcher) And now? The same! (laughs) But at least now I understand better why it's useful, even if I'm never going to do it.
FG4	Well, I didn't have contact with these things before, and I find it really cool that you can use many tools to do different things, to make it interactive [..] and help the person learn easier… I even see myself doing this more than standing in front of the class and talking…

6.3.4 Stage 4

By the end of the course, some students made plans to continue on this journey beyond the course; most students were content about their achievement in the course and welcomed the use of ID and educational technologies in their future work.

Reflection 5-13	I liked this system and I want to do something similar in the company where I work. I hope I will not get a lot of resistance to change or the fear that trainers will be replaced by computers.
Reflection 5-33	[completing this project] was the first proof in my academic and (short) professional life that I grew up.

6.3.5 Conclusion

Even though students started the course openly questioning its relevance and doubting their capacities, by the end of the course at least the former had changed. In this respect, I achieved the goal of giving students the opportunity to experiment, even if peripherally, what being an instructional designer means. For some, this sparked an interest into a specialized career,

for others, brought an awareness about the relevance of this area. Working on a real project and interacting with real clients were instrumental in achieving this awareness.

6.4 Multi-membership

As explained in section 2.3.3, *multi-membership* refers to the influences between trajectories in all the communities of practice that one is, or was, a member of. Table 6.6 presents my goal in relation to this concept, as well as the findings associated with each course stage.

Goal	Students should consider the influence between their different memberships.
Stage 1	Students make no connections with their other memberships, except the student membership. Some are open to experimenting.
Stage 2	Students show little reliance on other memberships, even less when trajectory becomes more defined.
Stage 3	Students found some connections between their identity as instructional designers and their other identities as students or professionals.
Stage 4	By presenting to the client, students felt treated like professionals and stepped out of their student identity.

Table 6.6 - Multi-membership - overview

6.4.1 Stage 1

Students started the course either with very little professional experience, or with a desire to move away from their experience, as evidenced by their answers to the questionnaire.

During the debates, students hinted to their experience as students, but no references were made to their professional experience.

Debate 2	I liked their idea that you need to keep up with the times and you cannot teach like 100 years ago... I mean, you can... the proof is... (all laugh) but it's not effective.

What was surprising, as shown below, was that, when choosing e-learning samples to analyse, many students selected the ones less familiar to them, which increased the difficulty of the analysis. Students seemed to be opening up to a breadth of new experiences, rather than having an in-depth approach.

Teacher's journal (after S3)	I don't understand why some of them chose to analyse the content about driving skills, and mediation. They admit themselves it was difficult to understand, with the legal jargon and their English not being great. I asked and they said they looked at many samples, were curious to see as many things as possible, and wanted to do "what is difficult".

6.4.2 Stage 2

In the reflections after the role-plays, only four students relied explicitly on other memberships to make sense of the current experience, with mixed results including alignment, contradiction, projection and confusion.

Reflection 1-26	For me it's important not to be the person who asks the questions. When I did focus groups, it was easier to take notes and insert questions on areas that were relevant, but not covered. So, I could formulate new questions based on the received information... questions you could not anticipate.
Reflection 1-33	I was lucky that what we discussed with my "clients" was customer service– exactly the job that I am doing for a year now – I knew everything they needed! [..] After the meeting, I had a bitter taste. This manager only had one whisper in his head: money, money, money... I said, well, let it be, but I got carried away and at the end I realized how little I found out…
Reflection 1-1	I would like to have the same response to the role-plays that I will design, in my learning activities.

Reflection 1-6	.. I behaved like I wanted to be received by the client. [..] It turned out I was the one who did not follow the script, for the reason I explained above.

Notably, in the reflection after the actual meeting with the client, students made no references to their other memberships, with the exception of a student who worked in the same field.

Reflection 2-6	What was relevant for me was to find out that auditors started personal development courses, which seems very useful, something I would have liked to attend.

6.4.3 Stage 3

Some students explored the possibility of using the competencies developed by this course to create content for their other courses, showing a strong allegiance to the student identity.

FG2	Everyone complains of this, that there's no time to teach, to give all the content in the discipline syllabus, so it could be supplemented by pieces like this, with e-learning, if we have a VLE.
FG4	Ever since I worked with BranchTrack, and it was really not easy, I started to see the information in smaller chunks. And at the course of professor [X], we had to give a presentation on Wednesday, and this is how I made it, in small chunks and I saw they understood and remembered quite a lot.

In time, they envisioned the creation of a virtual library to which each generation of students can contribute, leading to stronger alumni identity.

FG2	It's an identity that people embrace... and you can identify them easier, it's a bigger community, if you look, there are not many people who graduate from our programme…

Few students considered how the course impacts their professional decisions.

FG3	The adult does not need a lot of theory and honestly, I was thinking, we will organize a course with the teachers, and I think the young ones, with the educational concepts we want to approach, would be... would understand much better with this kind of presentation, [..]

6.4.4 Stage 4

Presenting their projects to the clients made students feel like their effort was appreciated and they are treated like professionals who are given feedback with the expectation to improve their product.

Reflection 4-30	It was surprising when what we presented was labelled as "the first draft"; at that time all I could think of was all the effort we made to get to that point and all the drafts we needed for that. After, I realized it is the first draft that **they** had seen and indeed, after the changes suggested, I see it's not close to being a final version.
Reflection 4-34	At the time it was not very comfortable, but now I appreciate the feedback they gave us. It was a serious meeting, and they took it seriously, not like an exercise with students.

6.4.5 Conclusion

The student identity seemed to be the one that students privileged, instead of their professional ones, when they made connections to their other memberships.

6.5 Overview

Given their perceived lack of technical abilities and their disbelief about the effectiveness of educational technology, students started the course on a very *peripheral trajectory* with the *joint enterprise* to pass the course. *Mutual*

engagement was low; students prefer working alone. Their *repertoire* included pedagogical principles, such as transmitting the right content and keeping their learners motivated; technology and problem-solving are not well represented. Although many of them have some work experience, their *multi-membership* is not apparent so far; their student identity seems most important.

After interacting with the clients, students felt inspired by their energy and commitment, and their *trajectory* became more inbound, while other memberships faded into background. The client is now important in defining the *joint enterprise* they feel accountable to. *Engagement* evolved from hesitant and problematic during role-plays, to being enthusiastic after client meetings. Regarding their *shared repertoire*, students made concrete plans to practice some of the procedures.

During the development sessions, all dimensions of identity seemed very interconnected, as teams who worked collaboratively maintained their focus and explored more tools than strictly required. Students who did not meet and divided labour struggled to advance. Generally, students felt that designing for the online environment increases your accountability. For all students, the peer-review session provided an opportunity to become inspired by other people's projects. For the ones lagging behind, it was also a boost in motivation to speed up development. Most students remained on a peripheral *trajectory,* although some were more open to their future directions.

By the end of the course, students found themselves *accountable* to meeting the clients' needs and appreciated the clients' approval and feedback, especially as it was given to them as professionals, not merely students. Teams emphasized the importance of *mutual engagement* through face-to-face communication and making a joint effort. Regarding their *shared repertoire*, students experimented with tools, although the quality of the experience seemed related to the type of engagement. Practicing the procedures involved in ID was less effective than anticipated. Even if few students saw themselves involved with educational technologies after graduation, being on this temporary *peripheral trajectory* gave them a broader, more complete view on the training practice. Regarding *multi-membership*, the student identity seemed to be the

reference, and students' professional memberships were not discussed more than incidentally.

Having analysed the course through the lenses of project-based learning in Chapter 5 and professional identity in Chapter 6, I move now to present in the next chapter the main themes emerging from the integration of these two strands of analysis and discuss them in relation to the literature reviewed in Chapter 3.

7 Integrative analysis and discussion

7.1 Introduction

Having previously analysed the data using the two theoretical perspectives described in Chapter 2, my intention in this chapter is to present an integrated thematic analysis that highlights the interconnections between the elements of project-based learning and students' professional identity as revealed by the data, and then to discuss the implications in relation to the literature examined. Section 7.2 is dedicated to the presentation of the four themes identified. Next, in section 7.3, I analyse the connections between the four themes and the literature reviewed in Chapter 3 and discuss similarities and differences, thus highlighting the contribution of this thesis.

In order to answer the main research question,

RQ1: How are elements of project-based learning connected to students' professional identity development in a real-client, graduate instructional design course in Romania?

I chose and included in the theoretical framework (presented in Chapter 2) the model of PjBL defined by Jonassen (1999) to help analyse the design of the course, and the theoretical model of communities of practice developed by Wenger (1998) to make sense of the professional identity aspects. Corresponding to each of the two perspectives, I formulated two supporting sub-questions which I addressed in Chapters 5 and 6, respectively.

RQ1.1: How are elements of project-based learning manifested in different stages of the course?

In Chapter 5, I focused on the elements of PjBL and reported their manifestations during the four stages of the course. I emphasized my initial design intentions for the course and outlined how the elements of PjBL were manifested in actuality (which sometimes differed from my original intentions). I concluded Chapter 5 with an overview of the evolution of the PjBL elements throughout the course, thereby addressing RQ1.1.

RQ1.2: To what extent are elements of students' professional identity developed in different stages of the course?

In Chapter 6, I emphasized the elements of the professional identity framework and described my initial goal in relation to each of them, and their actual manifestations throughout the four stages of the course. I concluded Chapter 6 with an integrated picture of the development of the different professional identity elements, thereby addressing RQ1.2.

I now move on to present the themes which connect the answers to the sub-questions together. Doing so will allow me to form the building blocks for the answer to the main research question, which I will synthetize in the beginning of Chapter 8.

7.2 Themes

The four themes highlighting connections between elements of PjBL and elements of students' professional identity are as follows:

- Students' existing *repertoire* influenced use of *multi-membership* and *related cases*,
- Students' *accountability to a joint enterprise* was shaped by the clients' presence in the *problem-project space,*
- Client's presence in the *problem-project space* reduced the need for *cognitive and affective contextual support* provided by teacher via a strengthened *accountability to a joint enterprise*,
- Students' *mutuality of engagement* influenced the acquisition of elements of the *shared repertoire*, including *cognitive and collaborative tools.*

My priority in ordering the themes was to facilitate comprehension, by taking into account two aspects: the first is the longitudinality of the study, the fact that it follows the stages of the course in order and it investigates how the importance of the elements developed along those stages; the second aspect is related to the web of relationships existing between elements, which makes it necessary for some themes to be presented first, before others can be

understood in their complexity. However, some forward references could not be avoided.

In the following sections I will present, in turn, each of the four themes. For each of them, I begin with a short explanation of the main point being made. Next, I present how the theme connects the evidence presented in Chapters 5 and 6, as well as the key links between elements of PjBL and student identity development. After I elaborate on each of the key links, I close by summarizing them and pointing out implications that will be discussed in section 7.3 and in Chapter 8.

7.2.1 Students' existing repertoire influenced the use of multi-membership and related cases

This theme shows how underdeveloped reflection and problem-solving skills, understood as elements of the students' existing *repertoire*, make it difficult for students to use *related cases* and *multi-membership*.

The theme connects the evidence associated with the concept of *related cases* (section 2.4.2), pertaining to the PjBL framework, to the evidence about *shared repertoire* and *multi-membership* (sections 2.3.1.3 and 2.3.3), pertaining to the professional identity framework. The teacher's instructional design expectations (illustrated in Figure 7.1.a) were to use students' previous experiences stemming from their *multi-memberships,* as well as prepared *related cases* to create a base of design precedents (see section 2.2) that would inform the solution design for the new problems. The base of design precedents is an essential part of the instructional designer *repertoire.* The evidence gathered in this case study suggest, however, that students' existing *repertoire* is an unexpected mediating factor in this relationship, illustrated in Figure 7.1.b.
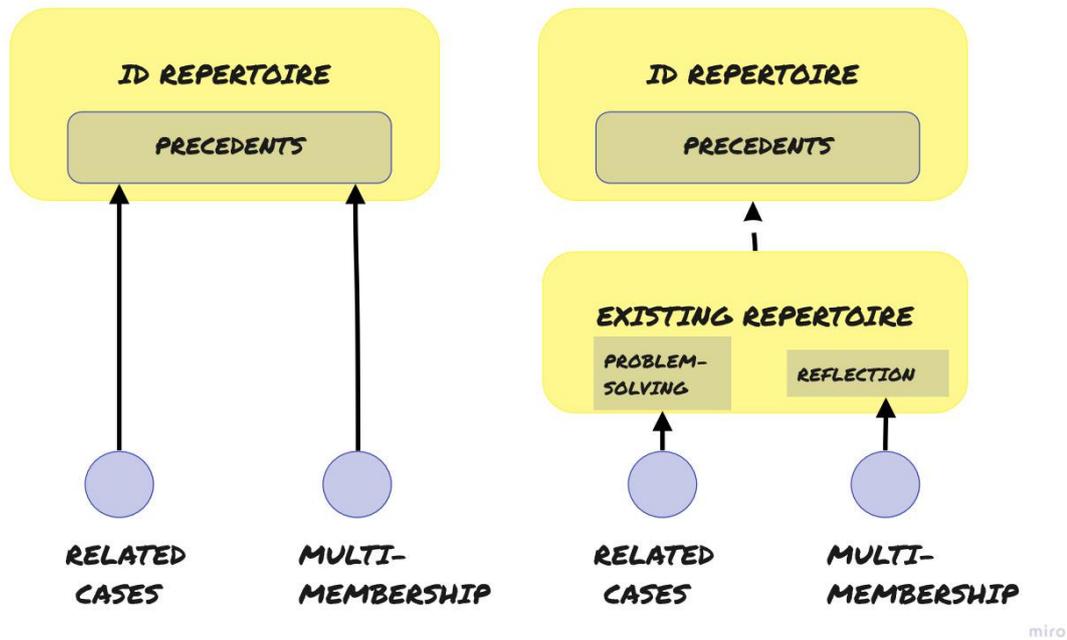
Figure 7.1 - Students' existing repertoire influenced the use of multi-membership and related cases: a. Intention, b. Findings

The evidence about students' *multi-membership*, presented in section 6.4, suggests that, firstly, students had difficulties with deriving meaning from experiences belonging to their other memberships, and secondly, the 'student' membership is the most powerful membership they constantly revert to. Each of these ideas, considering key connections between *multi-membership* and existing *repertoire,* are developed below.

Students' existing professional experience, with some exceptions, was of small duration and located in unrelated fields. Those active in fields relevant for their projects were making use of their theoretical knowledge, but, surprisingly, their practical experience was not prominently highlighted in the data collected, or not in a helpful way ("I was lucky [..] I knew everything they needed! [..] at the end I realized how little I found out", Student 33). I should note that it is entirely possible students did mention it more in team meetings outside class, where I was not present. Notably however, their experience of solving problems (in any circumstances) was very rarely used in the creation of their present solutions, although the creation process was discussed amply in my presence. Given that it is unlikely that students have not previously been exposed to solving problems (although perhaps not in an explicit way), this

suggests a lack of reflection on their existing experience when conceptualizing the problem-solving process. This, in turn, suggests that reflection-on-action is missing from the *shared repertoire* students had prior to the course.

The one identity students constantly turned to during the course was their identity *as students.* As discussed later in section 7.2.2, at the beginning of the course, when students knew nothing about their new journey, they relied heavily on their 'student' identity; subsequently, when they started to get a clearer picture of what being a consultant means, influenced by the client requirements and behaviour, they focused on the new path and abandoned all discussion about their old identities, *except* the student one. As they walked on this path, surprisingly, they rarely combined the ID identity with the trainer one; instead, they looked for an extension of the student identity, evident in the excerpt below related to the focus groups (see 6.4).

Teacher's journal (after FG4)	I asked for ideas about how we can better link what we do with the other courses. But instead of thinking how we can apply in the modules what they learn elsewhere, they were making plans of applying what I teach them to learn better the other courses [..].

Towards the end of the course, influenced by the second meeting with the client, some students made efforts to distance themselves from their student identity and to move towards a designer one:

Reflection 4-30	It was surprising when what we presented was labelled as "the first draft"; at that time all I could think of was all the effort we made to get to that point and all the drafts we needed for that. After, I realized it is the first draft that **they** had seen and indeed, after the changes suggested, I see it's not close to being a final version.

The key connection of the evidence about *related cases* was with problem-solving skills, another element of the students' existing *repertoire.* The activity of analysing *related cases* was incorporated in the course design to help students understand what kinds of problems and solutions are involved in the

ID field. *Related cases* discussed included snippets of projects from my portfolio as well as those shared by an online professional community. However, as presented in section 5.4.2.2, students' discussion centred more around what a problem is and how the solution is not created by applying some sort of an algorithm:

Teacher's journal (after S2)	[the students] seemed to believe that the client tells you exactly what they want, [..] and all you had to do was to develop it and maybe to brush up a bit on the language.

These findings, especially when considered in light of the pre-session questionnaire (see section 5.3), indicate that the students were not familiar with the problem-solving process and solving problems is an element missing from the *shared repertoire* they brought to the course from their student membership.

To conclude, I suggest that novice students had difficulties using *related cases* or their own experience stemming from their other *memberships* – not necessarily because they are novice in the ID field (which is expected), but because their *repertoire* as 'students' (this being their common and most powerful identity) does not contain significant elements of problem solving and reflection on their experience. The presence of a relevant *membership* or of *related cases* does not guarantee they will be used effectively, as the evidence indicates that this relationship is mediated by the contents of their *shared repertoire* as students.

The theme highlights links between one aspect of how PjBL was used (namely, *related cases*) and two aspects of student identity development (namely, *multi-memberships* and *shared repertoire*). The implications for teachers are that elements of the students' existing repertoire, especially problem-solving and reflection skills, should be investigated and reflected in the course design before actually applying PjBL.

7.2.2 Students' accountability to a joint enterprise was shaped by the clients' presence in the problem-project space

This theme indicates that including the client in the problem-project space influenced how the students shaped their accountability to a joint enterprise to integrate multiple sources in an individual view.

In this section, I highlight the key connections between evidence regarding *accountability to a joint enterprise* (see 6.2.1) and evidence regarding the *problem-project space* (presented in Chapter 5).

The analysis in Chapter 6 shows that during successive stages of the course, students' *accountability to a joint enterprise* changed from being accountable only to the teacher and class rules, to also being accountable to the client, beneficiaries, and their own design. I suggest these changes were shaped significantly by the presence of the clients, understood as an element in the *problem-project space*. As a brief reminder, the *problem-project space* includes the problem representation, the problem context, and the problem manipulation, and the client's presence, as described in section 2.4.1, can be an element in all three aspects.

As illustrated in Figure 7.2.a., the intention for including the client was twofold: first, to contribute to students' motivation, thereby strengthening the *accountability to a joint enterprise* and second, to allow the development of specialized skills such as client interview and presentation which would become part of the ID repertoire. However, as depicted in Figure 7.2.b, the main influence of the client's presence was on the accountability to the joint enterprise, with a negligible effect on the acquisition of the targeted elements of the repertoire.

Regarding the weak effect of the client meetings on the development of the repertoire (sections 5.4.2.1 and 5.6.2.1), students asked few questions during the first client meeting, and had limited opportunities to practice their final presentation, so I could not discern any notable gains in these particular elements of the repertoire. On the other hand, the effect of the client's presence

on the accountability to a joint enterprise was noticeable and this theme is dedicated to the description of its evolution during the phases of the course.
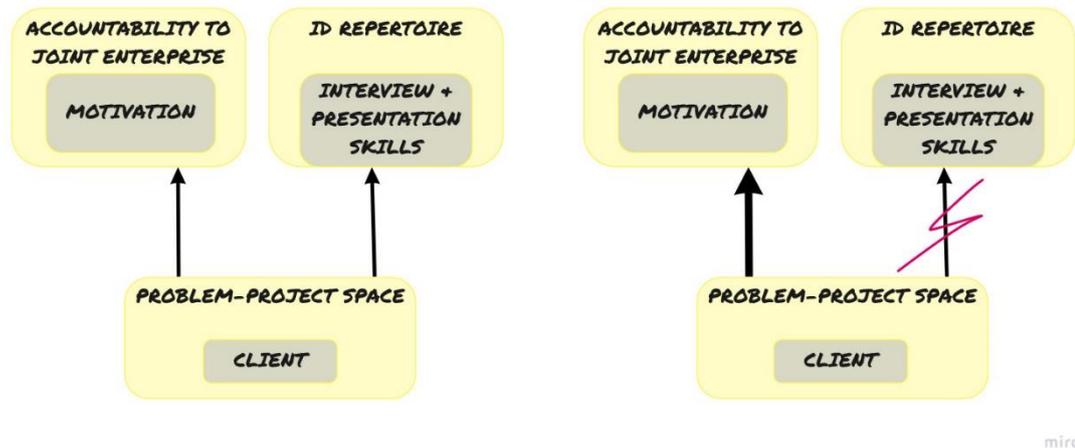
Figure 7.2 - Students' accountability to a joint enterprise was shaped by the clients' presence in the problem-project space: a. Intention, b. Findings

As described in section 6.2.1, students' sense of *accountability* at the beginning of the course was directed towards the goals of passing the course and applying "pedagogic principles" (Debate 1). In this respect, their perspective reflected their identity as students, which in this case was oriented towards following rules and accomplishing the tasks prescribed by the teacher. Their limited accountability towards each other was also expressed by each student covering their own, pre-established, shares of the team assignments. This low sense of accountability was connected with a low understanding of the concepts involved in defining the *problem-project space* (section 5.4.2.1), with evidence indicating that problem-solving was not a significant part of students' identities, as already discussed in section 7.2.1. One concrete corollary of that was that students had difficulties imagining a real client (section 5.5.2.1).

The defining moment for the beginning of change in this dimension of identity was the first client meeting, which confronted the students with a different set of requirements, apart from the ones of passing the course. Being confronted with real problems presented by the clients eased students into a professional role, as shown in the excerpt below, and prompted them to explore and deepen their understanding of the elements of the *problem-project space* – first by investigating the contexts of the problems and then by attempting to

manipulate those problems by using the authoring tools. In other words, by shifting their *accountability* towards the clients, students became more open to investigate and experiment as opposed to merely following teacher's instructions.

Reflection 2-7	An important idea that stuck was that people there are very professional and they expect us to be the same. Just as engaged and serious in all the work we're going to do for them.

During focus groups students started to consider their *accountability* explicitly and to differentiate it from what they had conceived previously as their responsibility as trainers, by including a significant element of deliberation: "[as a trainer] you adapt on the spot… Here it seems like you have to predict everything before" (FG1). This dissonance, as well as dissensions within the teams, pushed them to define their own stances. At this point, their sense of accountability started to include not only the client, but also their own perspectives as designers.

This new awareness of their own voices as designers, rather than trainers, continued to take shape in the peer-review session (excerpt below) that prompted students to re-focus on their clients (after spending weeks immersed in technical work) while attempting to articulate their own, individual, designer perspectives.

Peer review observation	Student (surprised): I thought all modules for the same client will have the same structure and look the same. Teacher: Was that your intention? Were you trying to do this? Student (laughing): Well, no. It's the same client, but we're different.

The final presentation to the client, as part of the *problem-project space* (expanded on in 5.7.2.1) continued to shape students' *accountability to a joint*

enterprise with three elements in particular apparently influential: client's approval, client's feedback, and perceived incongruences. Students identified clients' approval as an important indicator that the expressed needs were satisfied, and they were sufficiently validated in their role as consultants. This led to changes in their accountability to each other: although not all students did their part in preparing the modules, their positive contribution to the presentation was appreciated by their colleagues and conversely, students who had worked hard judged themselves more harshly about minor mishaps during the presentation, indicating they cared not only whether their solution was a good one (in teacher's assessment), but also if it appeared to the client to be good.

Clients' feedback and suggestions for improvement were also appreciated by the students and interpreted as opportunities to develop further as professionals, in contrast with typical school practice, where even if descriptive feedback is provided, its implementation is rarely requested. However, it should be noted that clients' approaches were quite diverse, so it is difficult to say, based on the data, which client behaviour contributed more efficiently to the shift in students' *accountability to a joint enterprise.*

Some students (as I will detail in the next section) continued to figure out the perceived incongruences between the views of different stakeholders: the learning needs expressed by the beneficiaries of their courses, the clients' requirements communicated to them, and their own design perspective. This process revealed the significance of being able to defend one's design decisions, as an outward, visible element of their *accountability to a joint enterprise.*

In conclusion, it seems that the clients' presence in the *problem-project space* was instrumental in moving students from their 'student' identity to a 'professional' one, through a sequence of intermediate stages. Although the same problems might have been presented without the clients, introducing them into the learning relationship enabled students to position themselves as consultants, and not just as students, as they were in relation to their teacher. By the end of the course students were starting to define their *joint enterprise*

themselves, by combining and mediating between the various internal and external sources of requirements and constraints.

The theme highlights links between one aspect of how PjBL was used (namely, *problem-project space*) and one aspect of student identity development (namely, *accountability to a joint enterprise*). The theme has implications for teachers, concerning the decision to include the client in the project, and for students' experience of more authentic PjBL, facilitating their trajectory towards becoming a professional.

7.2.3 Client's presence in the problem-project space reduced the need for cognitive and affective contextual support provided by teacher via a strengthened accountability to a joint enterprise

This theme shows that the interaction with the clients provided students with additional cognitive support. Students started to perceive themselves more as consultants, hence becoming more self-reliant and requiring less affective support. Both of these mechanisms contribute to lessen the support load of the teacher.

Providing support, as discussed in section 2.4.4., means offering instruction, feedback, hints, questions, explanations or models to support cognitive, metacognitive and affective goals. Building on Theme 2 (7.2.2), the connections highlighted here are between the strengthened *accountability to a joint enterprise* provided by the client's presence in the *problem-project space* which led to a decreased need of teacher-provided *cognitive and affective contextual support*.

The students' needs for *affective support* changed in close connection with the students' trajectory of professional identity formation (see 6.3). As expected, at the beginning of the course, when students were dealing with the stress created by the discrepancy between the perceived difficulty of the projects and their own capabilities, their affective support needs were high, corresponding to a limited sense of identity as instructional designers and a stronger identity as students. Their predilection to words asking closed

questions (see 5.5.2.1.2) can suggest an aversion towards uncertainty. However, by the time students engaged in role-plays and actually met the client, their confidence levels rose significantly, as they identified more with being and acting like consultants (the identity they associate with finding solutions to a problem, see 6.2). In the second half of the course, their affective support needs rose again, but for different reasons according to the route taken by the team (see 7.2.4): teams displaying *engagement via joint effort* were dealing with the ambiguities inherent in the design process, while teams displaying *engagement via dividing labour* were facing the frustration of unresolved obstacles, mainly the uneven engagement of members. The peer review event provided support for all teams. At the end of the course, when they presented to the client, all students showed willingness to take at least some responsibility for the feedback they received, as well as for their team's performance, as shown in the excerpts below. Overall, on the course, it seems that the more students self-identify as consultants, the less intense is their need for *affective support*, as they became more self-reliant – more willing to deal with stress, ambiguity and frustration, and regarding those as useful tensions and not something to be fixed.

Reflection 4-17	I liked to see that our work and engagement were noticed and our vision was appreciated. It was also valuable the feedback of the lady who told us openly where and what to modify, without holding back, because the purpose is to learn from it, not to stroke our hair.
Reflection 4-34	At the time it was not very comfortable, but now I appreciate the feedback they gave us. It was a serious meeting, and they took it seriously, not like an exercise with students.

The *cognitive support* offered throughout the course took a range of forms, feedback being the most time-consuming. It was also difficult to provide differentiated support to teams at very different stages (for instance, instruction and modelling were done multiple times for different teams). Yet, as shown below, towards the end of the course, students disregarded my feedback and were waiting for the client's feedback.

Teacher's journal (after S13)	[..] They just don't do it [implement teacher's feedback]. They promise and promise…

Receiving feedback from the client made students feel like real professionals, by not withholding criticism and by viewing the timeline from a business perspective, with feedback needing implementation, as opposed to an academic one, where the semester – and the project – have ended.

Reflection 4-7	I think the negative feedback was constructive and wherever we can, we'll make the changes because we actually worked thinking that somebody will use our course for real.

To conclude this theme, including the client meetings in the process provided, directly and indirectly, significant *cognitive and affective support*, influencing positively students' commitment to the ID *trajectory* and lightening the already heavy *contextual support* burden of the teacher.

The theme highlights links between two aspects of how PjBL was used (namely, *problem-project space* and *contextual support*) and one aspect of student identity development (namely, *accountability to a joint enterprise*). The theme has implications for teachers, related to how they organize contextual support and client's involvement, and for students' experience of PjBL.

7.2.4 Students' mutuality of engagement influenced their acquisition of elements of the repertoire, including cognitive and collaborative tools

This theme indicates that the way students work together in teams, namely whether they split the labour or join their efforts, has a one-directional effect on how they use cognitive and collaborative tools. Importantly, the decision to work collaboratively does not seem influenced by the tools provided.

This theme analyses the connections between the kind of *mutual engagement* in the project teams and the different ways of approaching and using the *cognitive and collaboration tools* provided. As illustrated in Figure 7.3.a, it was expected that using *collaboration tools* would influence how

students engage in teams during the project. The instructional design intention related to *mutual engagement* (see section 6.2.2) was that students would work together collaboratively throughout the project, rather than just split the work. The reasoning was that if students have to express and negotiate their views in the teams, they would have to explicitly reflect in- and on-action, which are part of the target repertoire. Regarding *cognitive tools*, namely authoring tools, the intention was that by providing them together with support on how to use them, these tools would also become part of the professional repertoire. In fact, the opposite of expectations was found, as students mutual engagement determined how they used the tools, as depicted in Figure 7.3.b. The teams exhibited two types of *mutual engagement* and one of them had a strong positive influence on the use of *cognitive and collaboration tools*.
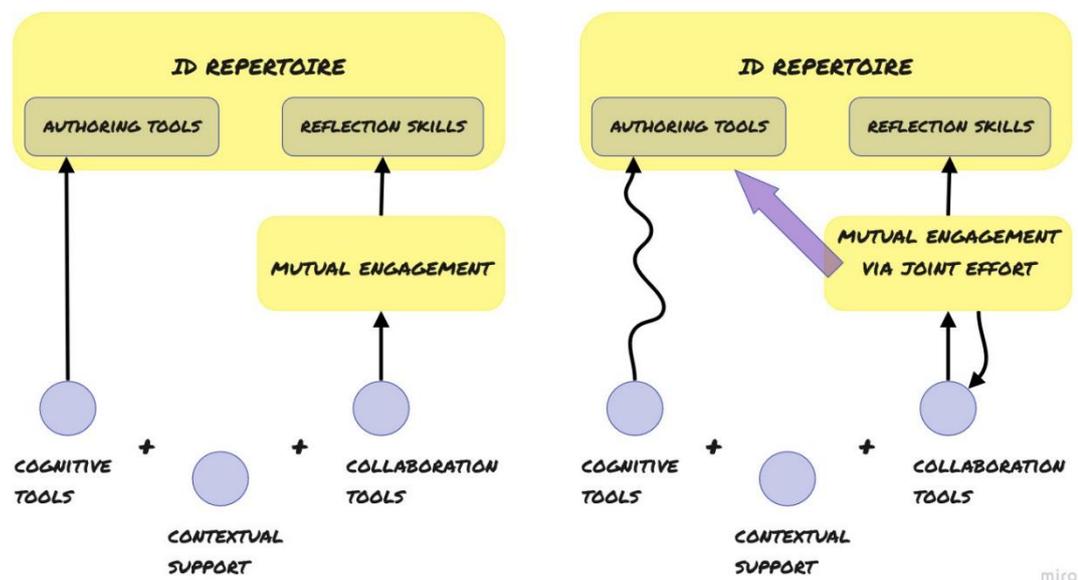
Figure 7.3 - Students' mutuality of engagement influenced their acquisition of elements of the repertoire, including cognitive and collaborative tools a. Intention, b. Finding

Across the two cohorts, two types of team engagement were discerned, represented in comparable numbers. One kind of engagement, referred to as *engagement by joint effort*, was characterized by more team meetings in and outside of class. Even if some work was split between the members, there were also significant elements that members worked on together and constructed as a joint effort. These teams made more progress quicker and had more time to explore some of the finer points of ID. Notably, these teams also met more

online as well, using a variety of collaboration tools. Regarding cognitive tools, especially authoring tools, they explored a wider array of tools and made informed decisions about what to use (in addition, or instead of the recommended ones). In the written reflections they showed accountability towards many kinds of stakeholders, although they couldn't always solve the discrepancies in requirements that arose (such as between clients' and beneficiaries' requests). As shown in excerpts below, searching for solutions and working constantly with their peers helped crystalize their own voices as designers. Their reflections were typically longer than those of members of the other type of teams, and contained analytical elements besides the descriptive ones.

Reflection 5-36	Because we all worked during the week, we met in the weekends at the house of one of us to work of the project in optimum circumstances.
FG3	The first time I looked at BranchTrack my head was in chaos, but then you start to work and discuss and see how much you can do…

In contrast, the second type of engagement, referred to as *engagement via dividing labour*, was characterized by less frequent meetings, in and out of class. The members of these teams split up the work and tried to integrate the parts in the end without using the collaboration tools provided. These teams lagged behind, and they also declared a strong reticence towards working online, which they did not use to compensate for obstacles to face-to-face meetings. They did use the required authoring tool, but did not go beyond it; moreover, they wanted to extend its use to replace other tools (such as PowerPoint) in other contexts, without a clear justification. The primary stakeholder they sought to impress was the client. Their reflections were short and factual and although some acknowledged problems (see excerpts below), they offered few solutions. The trajectory of these teams seemed more peripheral and limited to the duration of the course.

FG1	If we were all here from the beginning, we could have gotten better organized... Like this, one comes, one goes, it's hello, goodbye... You wait, and wait, and think the other will do it, but the deadline comes and there's nothing.
Reflection 3-4	I don't know these things... If I studied computers, maybe I could have... But like that, it's a lot of information, everything is new... We need more time...

Students from both categories listed in their final reflection the difficulties they faced with involving members, allocating the roles, managing time and expectations, planning their efforts, executing and adjusting the planning, negotiating different opinions, as exemplified below.

Reflection 5-20	Teamwork is difficult, there are different personalities with totally opposite ideas.
Reflection 5-4	It was very difficult to get my colleagues involved or to contribute ideas. Some of them showed zero interest.

I should acknowledge that, of all types of support, *metacognitive support* for teamwork was one that I did provide the least, partly due to the priority I gave to cognitive support, and partly because I felt the issue of student teamwork spans more elements, including organizational, than I could tackle. Nevertheless, not being able to work satisfactorily with their colleagues was an aspect that influenced students' self-perception of success in this course, regardless of whether this impacted the final product or the presentation to the client.

In conclusion, working together on the project enhanced the effectiveness of the elements of PjBL, as *collaboration and cognitive tools* were used in more deliberate ways. Spending time together enabled teams to at least try and mitigate their differences, which provided them with richer material for reflection. This, in turn, impacted the *shared repertoire* they acquired, which not only included the technical tools involved in ID, but also increased reflection skills and possibly their capabilities to cope with teamwork challenges. Even if

the quality of the final products was not necessarily superior, the students who had a closer *mutual engagement* took more steps towards the designer identity than those who took a more individualistic route.

The theme highlights links between two aspects of how PjBL was used (namely, c*ognitive tools* and *collaboration tools*) and two aspects of student identity development (namely, *mutuality of engagement* and *shared repertoire*). The theme has implications for teachers, concerning facilitation of team work, and for students' experience of working together and using the tools provided.

7.2.5 Connecting the themes together

By examining the themes together, some interesting synergies can be noted between the two frameworks. For the ones that were expected (see 2.5), this case study serves to describe their mechanism. Others were unexpected, and they are documented here as a starting point for further investigation.

The first common thread is the role played by the students' existing *shared repertoire* in the way they receive elements of PjBL and manage to develop their professional identity. As presented in 7.2.1, existing *repertoire* elements such problem-solving and reflection skills influence how students can use *related cases* presented by the teacher or experiences from their other *memberships* to build a precedents base, which is a crucial element of their designer *repertoire*. The *repertoire* element of teamwork may influence the type of *engagement* students will adopt (as elaborated in 7.2.4) which in turn influences how they will use other elements of the *repertoire*, such as the *cognitive and collaboration tools*.

Another common element is the client's presence in the *problem-project space*. Advised by literature to provide authenticity, the client's presence influences both other elements of the PjBL design, and how students develop the type of *accountability to a joint enterprise* specific of design. These themes are explored in sections 7.2.2 and 7.2.3.

The themes seem to indicate that in order to facilitate an inbound, or initially at least a peripheral, *trajectory* towards the community of practice of ID,

some elements of the PjBL approach to the course need attention in a particular way, as I will elaborate in Chapter 8.

In the next section, I will turn to the literature reviewed in Chapter 3 and connect the findings of this case study to the arguments and claims derived from the examined articles to establish my contribution to knowledge.

7.3 Relating the themes to the literature

In Chapter 3, I examined two bodies of literature, related to: (1) the development of students' professional identity in practice-based settings, and (2) educational projects in design disciplines. I used the theoretical framework established in Chapter 2 to examine the selected articles, specifically employing the concepts pertaining to the communities of practice to analyse the extent to which identity development was evident in the scholarship from both areas, and the concepts related to PjBL to analyse course designs reported in articles from the second area. The reviewed articles reveal, in my interpretation, a fragmented landscape, with many unconnected insights, some of them seemingly contradictory. In this section, I relate my findings to the literature and examine whether they reinforce or differ from previous claims. Often though, apart from concurrence or difference, I find that my contributions emphasize connections between ideas, which ultimately can lead to a more coherent image of the issues relevant to professional identity development in design disciplines.

The following three sub-sections mirror the structure of the literature review chapter. First, in 7.3.1, I focus on my contribution to knowledge about students' professional identity development in practice-based settings. Next, in 7.3.2, I concentrate on my contribution to knowledge about students' professional identity development in educational projects in design disciplines. Finally, in 7.3.3, I delineate my contribution to knowledge about PjBL in design disciplines. In sections 7.3.1 and 7.3.2 the headlines relate to the findings of the literature review on identity in each of examined areas (see 3.2.5 and 3.3.5). In section 7.3.3 the claims are organized according to elements of PjBL, similar to the corresponding section of the literature review (3.4).

Each claim begins by introducing the main contribution I wish to establish. Next, I summarize the main focus or argument of the articles reviewed in order to make clear the body of knowledge to which I aim to contribute, before explaining how my study connects to existing research, what is the gap that it fills and the extent to which it supports or is different from the current scholarship.

7.3.1 Contribution to the knowledge on students' professional identity development in practice-based settings

My contribution highlights that the exposure of students to clients and beneficiaries brings about specific benefits in relation to their professional identity, which in turn have implications for two aspects discussed in the scholarship, namely the difficulties faced by students in practice-based settings and tensions between socializing students and promoting a critical stance towards the profession.

As summarized in section 3.2.5, research on students' professional identity development in practice-based settings focuses on three interrelated issues:

(a) that early exposure to practice is beneficial to students (by clarifying expectations, facilitating the acquisition of the repertoire and providing engagement with established members);

(b) difficulties faced by students in practice-based settings; and

(c) tensions between socializing students and promoting a critical stance towards the profession.

My research is in general agreement with the first claim, with the caveat that early engagement with experienced designers was only represented by the interactions with me, as both their teacher and a practitioner instructional designer. The following two sub-sections delineate the contribution of my research to the other two issues of the literature.

7.3.1.1 Difficulties faced by students when transitioning from university to work

One contribution of my research is in indicating that including the client and the beneficiary (see 1.8 for definitions) in the design of the educational interventions, and placing them in a prominent role, contributes to mitigate some of the difficulties that students have when they are trying to enter into communities of practitioners – by switching students' focus to the practice itself and to their own responsibility of achieving aims that are valuable for those directly impacted. Consequently, this client orientation has potential to free students from the burden of making sense of the different professional models they encounter in the practice, and give them a more straightforward measure to assess the suitability of their own approach.

The current literature indicates conflicts of expectations and problematic situations, as well as failure to adopt the community's repertoire, leading to marginal or outbound trajectories, and difficulties in giving up the student membership (see 3.2). I noticed that many of the difficulties described in the literature are related to students' interactions with established members of the work communities they seek to enter, such as fellow teachers (Johnston, 2016) or experienced pharmacists (Noble et al, 2014). Although the articles were specifically chosen to reflect practice-based settings, the relationship students develop with the clients or the beneficiaries of their practice is less evident in the scholarship, the authors focusing instead on the relationships with the established practitioners they encounter. Without diminishing the importance of the interaction with practitioners, I suggest that other stakeholders can contribute in different ways to the development of students' professional identity.

In contrast to the literature, which is largely silent about the impact beneficiaries and clients have on students, the present study reveals the significant importance of the clients' presence, especially through Themes 2 and 3 (7.2.2 and 7.2.3) which suggest that the students' accountability to a joint enterprise is strengthened and that students may become more self-reliant and require less contextual support as a result of their direct interaction with the client. Moreover, as Theme 1 (7.2.1) suggests, the students' existing repertoire,

including their reflection skills, influences how they make sense of related cases and, by extension, of models provided by other practitioners. Not relying exclusively on practitioners finds support in Wiele et al (2017), who suggest an associate consultant role for students in their capstone projects, and some indirect support in Dehings et al (2013), who argue against the mentorship model in engineering; however, the distinctiveness of my contribution lies in pointing to the client as a different, or additional, reference point the students can use early on to enrich their perspectives and mitigate the problems they might encounter with more established colleagues when entering the community of practice.

7.3.1.2 Socializing students into the profession versus facilitating the development of a critical stance

Another contribution of my research is that it examines the mechanisms by which students' sense of accountability evolves in relation to their interaction with the client (and is less influenced by the expectations of other practitioners). While much existing literature has a before-after, observational view of the students' sense of accountability, this case study looks at the *process* of change and, more importantly, considers that change in relation to students' actual practice. When students have the opportunity to form their own views and make their own decisions in relation to a goal that is authentic to the practice (and incorporates views of clients and beneficiaries), socializing them and developing a critical stance are not necessarily opposites.

By focusing on students' relationships with their established colleagues (see 3.2.2.3), many authors assume a view of socializing students into the profession (e.g. Zhang et al, 2018; Deng et al, 2018); however, there are authors who advocate for students' embracing a critical stance and acting as change agents (e.g., Trede, 2012). While the literature agrees that practice gives students a more complex image of the profession and its social role, it does not explore the mechanism by which this new awareness about the profession is fed back into the identity construction process. In my findings, I illustrate how students' sense of *accountability to a joint enterprise* is transformed by the conflicts and incongruences they see in the various

requirements and expectations that stakeholders have: for instance, the beneficiaries requesting training on assertiveness and the clients implying this is not needed (see 6.2.1). When confronted with these conflicts, students need to make their own design decisions and be able to defend them, leading to a more personally constructed sense of accountability that will not necessarily run either along or against established practices. That implies, in turn, that the tension between the socialization and critical stances might be reframed into a wider perspective which supports the creation of professionals' own voices, outside pressures to comply or to resist.

To summarize both aspects (7.3.1.1 and 7.3.1.2), without diminishing the importance of the practitioners, my research suggests that including the client and the beneficiaries in the *problem-project space* can play a crucial role in the definition of the students' *accountability to a joint enterprise* without indiscriminately socializing them into the profession. Of course, as I explain in Chapter 8, further research is necessary in order to make the most out of the clients' presence and to integrate it into a balanced perspective that takes into account all relevant influences, including from peers.

7.3.2 Contribution to the knowledge about students' identity development in design disciplines

The following subsections establish my contribution in relation to the body of literature on educational projects in design disciplines, examined in Chapter 3 in section 3.3 through the lens of professional identities and in section 3.4 through the lens of PjBL. Since this thesis focuses on finding connections between the elements of the two frameworks, both will be considered when presenting the knowledge claims in the following sub-sections. This section (7.3.2) focuses on the significance of the contributions for identity development, while the next section (7.3.3) presents the contributions from the perspective of course design using PjBL. I highlight these different perspectives to emphasize the relevance of my contributions for scholars and practitioners with interests in either, or both, areas.

7.3.2.1 Building own voices as designers requires interactions between all sources of accountability

One contribution of my research is in indicating that, in order for students to build their own voices as designers, all sources of accountability should be considered, including the client and the beneficiaries.

The reviewed literature (see 3.3.2) shows a variety of sources from which students derive their accountability, which I characterised as external (course, client, social) and internal (own learning, design and beliefs). I note that only three articles (e.g. Woolf & Quinn, 2009) look at the connections between these sources, and they illuminate only very limited areas of understanding. However, as I explain in section 1.6, using *design thinking* (see 2.2) – the kind of reasoning that solves complex, open-ended problems with many constraints – makes it important to attend to these connections in the instructional designers' education.

In contrast with earlier literature, which considers only one or two sources, I suggest that all sources of accountability should be taken into account together and that, while conflict might be present, making the effort to reflect on that conflict and integrate apparently contradictory requirements is essential in becoming a designer. This point builds on my earlier discussion in section 7.3.1.1, where I described how including the client or beneficiary in the students' engagement with practice offsets the pressure exerted by experienced practitioners and mitigates the difficulties of entering the new community. However, as shown in section 3.3.3, the transition from 'student designer' to 'professional designer' is not an externally conflictual one, unlike sometimes in other disciplines. Therefore, the additional point that I make here is that integrating all sources of accountability, resulting in a personal view of the design enterprise, has a special relevance in the design disciplines, where the road to expertise goes through ever deeper levels of reflection and self-awareness.

Starting from a situation where accountability to the course requirements and to their own learning can be assumed – given the students'

enrolment in an educational programme, by interacting with the client the students are faced with a different set of requirements and constraints they must meet. For students, this enables further investigations (see 7.2.2) into the requirements of beneficiaries leading to acknowledgements of the wider social impact of their projects. If conflicts arise between any elements (and if a project is to be challenging, they should), students must examine explicitly their own beliefs and make decisions which will be reflected in their own designs. This process of integration requires students to engage in increasingly deeper levels of reflection. Being accountable as a designer ultimately means creating a defensible solution that sufficiently satisfies all the relevant constraints. Because design problems are open-ended, the proposed solution itself is as important as the argument that supports it (referring back to terms defined in 2.2, the working principle and the product must both be created). While experienced designers might be able to devise both without interacting with the client, it seems that a novice designer – a student – needs to meet the client: firstly, to encounter a different perspective (see 7.2.2) and, secondly, to be cast in a professional role which requires the integration of these perspectives while tolerating ambiguity and uncertainty (as explained in 7.2.3).

7.3.2.2 Mutual engagement influenced how students used cognitive tools to build a shared repertoire

Another contribution of my research is in indicating that peer *engagement via joint effort* leads, one-directionally, to a more complex way to use the *cognitive tools* than *engagement via dividing labour*. In this way, I create a connection between the two identity dimensions of *mutual engagement* and a *shared repertoire* via an element of course design, the *cognitive tools*, as explained in Theme 4 (7.2.4).

When examining engagement with peers, the articles reviewed reveal both benefits and challenges (see 3.3.2.2), but do not explore or compare their impacts on students' identities. In addition, the articles are generally silent on the different ways students use and integrate cognitive tools in their projects; although tools are mentioned in all articles, it is only their administration that is described (see 3.4.4), rather than their use by students. What my research

suggests is that, in order to facilitate the incorporation of the relevant tools into the students' repertoire, merely offering them along with support is not enough, as it is the kind of engagement that each team enacts that influences how the tools are used. Currently, this link is missing from the articles, along with a thorough analysis of how students incorporate the tools they are using into their professional repertoires.

Although my study does not provide data to explain why some teams engage in joint effort while others divide labour, it does indicate that meeting more often and working through the issues together offer students the opportunity to engage in collective reflection which in turn provides them with deeper insights into the tools they are using (and possibly other aspects which were not salient in this research).

7.3.2.3 Connecting reflection skills to trajectories and multimembership

My contribution in this regard is that, at least for novice designers, it is not the variety of experience that facilitates their development as experts, but the reflection skills they use to examine their experience.

An argument prominently made in the existing literature (see 3.3.4) is that having diverse experiences coming from previous or concurrent identities is a contributing factor to building design expertise (e.g., Hardre et al, 2006). In contrast, a too strong allegiance with one other identity is viewed as raising obstacles to becoming a designer (Ge & Hardre, 2010; Tracey & Hutchinson, 2016, 2018b). However, this "other" identity seems not to be the student identity, as a large section of the articles see being a 'student designer' as a natural precursor of becoming a designer (see 3.3.3). As shown, the literature itself brings disparate perspectives on this issue.

What I have highlighted in this study is that, apart from bringing experiences, the other identities also bring their own repertoires, which may or may not include the tools necessary for the early processing of those experiences in the light of new contexts. For instance, as explained in 7.2.1, at the beginning of the course, students could not access previous experiences of

solving problems, because they did not have a model of the concept of "solving problems". Lacking the habit of reflecting on their experiences and discerning relevant from non-relevant elements, students could not effectively bring their past experiences into the discussion. In my study, I found the 'student identity' to be primary but my claim is that, rather than indicating that allegiance to any other strong identity is detrimental (as opposed to allegiance to many identities), it is the fact that the primary identity lacks certain elements in its repertoire that is unhelpful. In other words, it is not their primary identification as 'students' that prevents students from becoming designers, but the fact that their student identity does not include sufficient elements of problem-solving or reflection. In addition, this change of perspective illuminates why a strong 'student designer' identity in the more established design disciplines does not prevent, and in fact facilitates the transition to a professional identity (Gestwicki & Mcnely, 2016). However, as ID only recently started to implement design thinking, the transition might not be as straightforward.

This observation is not made with the intention of downplaying the value of diverse experiences in building design expertise, but instead, suggests that diversity may be beneficial at a later stage in the process, when students have more practice in reflecting. By showing that if reflection is not present, students don't consider their other identities, my research provides support for the findings by Shambaugh and Magliaro (2001) who observed that students who engage in reflection explicitly reconsider their other identities.

7.3.3 Contribution to the knowledge about educational projects in design disciplines

As shown in section 3.4.8, although the literature describes various ways of organizing a PjBL course and some of the associated benefits, it is often difficult for the reader who is a teacher to decide between competing approaches, because influencing factors are either not described, or not analysed. One of the important contributions of this case study is that it brings the needed richness of detail to allow readers to compare their own context to mine and make an informed decision about which course design decisions are likely to be relevant in their case. The following sections will summarize the

implications of the thematic analysis presented in section 7.2 for scholars interested in researching PjBL settings, and for the design educators wanting to create PjBL courses, following the same structure of concepts used to analyse the literature.

In Figure 7.4 below, I created an interlinked overview of the contributions (transparent boxes) in relation to the elements of PjBL (shaded boxes). These connections will be explained in the following sub-sections.
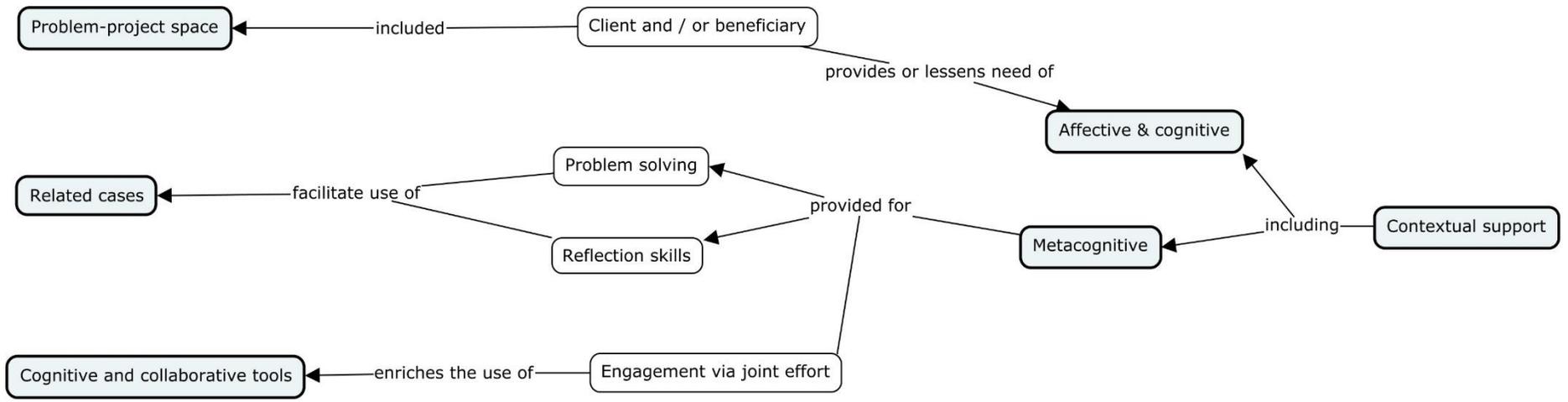
Figure 7.4 - Contribution to knowledge about PjBL in design disciplines

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My main contribution regarding the *problem-project space* is to place emphasis on the inclusion of the client and beneficiaries, for two reasons: (1) by interacting with the clients, students form a richer, more complete view about the problem and its constraints and (2) students obtain part of the cognitive support from the clients, and become more open to take risks and deal with ambiguity, thus requiring less affective support from the teacher. These contributions are relevant because, even if there are some articles that concur, they are very few and the client's involvement is largely not examined by the literature.

The first reason, as explained in Theme 2 (7.2.2), is that meeting the clients on at least two occasions – to learn about the problem and to present the proposed solutions – broadens students' perspectives and helps them to incorporate the views of these important stakeholders into their problem-solving process. Out of the 15 articles reporting about client involvement in educational projects, only two examined specifically the impact of the client, and they confirm these findings: showing that students' interactions with stakeholders led to bigger gains in skills and better understanding of the profession (Budny et al, 2016) and that integration between learner and client goals generates higher perceived value of the projects (Woolf & Quinn, 2009).

The second reason indicates how the identity-formation process mediates the students' levels of ambiguity tolerance and as a result decreases the amount of support they require from the teacher. This can be corroborated with findings from Cocchiarella and Booth (2015) who describe students rejecting teachers' feedback towards the end of the course, and from Bedard et al (2012) who find that the clients' presence has a significant influence on students' attitudes, leading to better engagement and persistence. However, not all the authors support the presentation of all products to the client; some describe teachers filtering the projects that the clients will see (Tracey & Kacin, 2014), while most do not mention clients' feedback at all. However, this study suggests that all students benefit from receiving feedback from the client, even

if it's less positive than they had hoped for, and knowing that there will be a presentation is a driver for all of them.

7.3.3.2 Related cases

My contribution to this aspect of the literature is in indicating that, in order to be effective, provision of *related cases* should be accompanied or even preceded by a reinforcement of reflection and problem-solving skills.

The literature reviewed in section 3.4.3 reveals that although teachers provide students with repositories of related cases and information, the students often do not use them (Boling & Smith, 2010), but the articles don't explore why this is the case. The contribution of this study to the literature is to suggest that students' previous repertoire influences how they will use any given resources. As elaborated in Theme 1 (7.2.1), repertoire components such as reflective skills and problem-solving skills seem especially important in this respect. While reflection is acknowledged by the literature to be an essential element to incorporate in PjBL to foster learning (Helle et al, 2006), I suggest that in order to function successfully for the purpose intended (ID education, in this case), a certain level of these skills is a pre-requisite. In Chapter 8 I discuss the implications for teachers and programme designers.

7.3.3.3 Cognitive and collaboration tools

The contribution of my research to this aspect of the literature is in suggesting that *cognitive tools* are used in a richer way when team members work jointly, rather than dividing the labour.

The articles reviewed describe a range of tools and arrangements made to offer them, but are largely silent on how students use the tools. In this respect, this study advances the suggestion – elaborated in Theme 4 (7.2.4) – that students' use of tools is influenced by how much they work together. This corroborates with observations made by Jensen et al (2002) that students who have more contact even out their differences by reflecting together and presumably building knowledge together. The finding also introduces a new perspective into the literature which previously seemed concerned only with the

amount of structure students should be given in the use of tools, and advocates for supporting students' joint efforts, especially collective reflection, perhaps by using the prototype of the product created as a central element, as suggested by Tracey and Kacin (2014) while at the same time paying more scholarly attention to how tools are being used in connection to effort organization. These implications will be discussed further in Chapter 8.

7.3.3.4 Contextual support

My contribution in this area is in indicating that, while introducing the client in the problem-project space can lessen the teacher's burden for cognitive and affective support, it is metacognitive *contextual support* in the specific areas of reflection, problem-solving and teamwork that has an influence on the students' effective use of other elements of PjBL, such as related cases and cognitive tools.

Regarding cognitive support through feedback, this study indicates that, as the presentation to the client draws near, students are less willing to implement the teacher's feedback (also observed by Cocchiarella and Booth, 2015) and are more interested in the client's feedback, indicating a possible way to naturally integrate a fading strategy in the contextual support, which is another aspect which the current scholarship does not illuminate.

Although affective support to ameliorate uncertainty and ambiguity is a concern in part of the articles (see 3.4.5.3), only one of them involved a real client and the ambiguity discussed was not one inherent to the design process, but was created by giving the client multiple roles (McNeill & Chernish, 2001). I do not imply that the client's presence lessens the ambiguity and uncertainty, but I do wish to suggest – in Theme 3 (7.2.3) – that it makes the students more willing to deal with those themselves, rather than needing significant amounts of affective support from the teacher.

With affective support requirements potentially reduced by the introduction of the client into the problem-project space, teachers can dedicate more time to metacognitive support which the reviewed articles show to be

currently focused on providing deadlines and reminders and facilitating individual reflection but without much contextualization. I suggest that support for collective reflection has the potential to address the pressing issue of students having difficulties with both teamwork, and awareness of their own thought processes, beliefs and intuitions, while at the same time ensuring the support is based on the specifics of the situation, and not pre-determined.

7.4 Chapter summary

In this chapter I presented the four themes derived from the data analysis in response to the main research question. Subsequently, I discussed how these themes are connected to the literature reviewed in Chapter 3.

In the following and final chapter, I reflect on how I addressed the research questions and achieved the results, and on the process that connected them. I also discuss the limitations and the wider implications of my study for practice, policy and future research.

8 Conclusion

8.1 Introduction

In the first part of this chapter I bring together the argument I have established in the earlier chapters. I begin by re-stating the research objective and the approach taken. After I summarize the findings and outline the answer to the main research question, I address the limitations of the study by reflecting on issues related to *transferability*, *dependability*, *confirmability* and *credibility* (Lincoln & Guba, 1985), and I summarize my contribution to knowledge. In the later sections of the chapter I discuss the implications for practice, policy and research.

8.2 Research objective and approach

This research was triggered by my involvement in teaching instructional designers against a backdrop of changes in ID education towards a more prominent *design* orientation. In particular, I was interested in establishing connections between how we teach ID and how students construct their professional identities. To examine those, I chose a theoretical framework with two components: project-based learning, described by Jonassen (1999), and professional identity in communities of practice, described by Wenger (1998). The concepts defined by the two components of the theoretical framework allowed me to analyse the existing literature, in order to map the landscape of scholarship in two areas: professional identity in practice-based settings, and educational projects in design disciplines. The literature review showed the areas to be quite different in terms of concerns and approaches. While in the first area the emphasis is on students' interaction with more experienced peers, and less with the clients or beneficiaries of their work, in the second area the scholarship is quite fragmented, reflecting a variety of unconnected topics (with one notable exception). The design approach emergent in ID education is weakly reflected in the literature, and issues of professional identity are generally under-researched and examined separately from research on educational projects, which is a traditional method in ID education.

Having identified these shortcomings, the study set out to answer one main research question, supported by two sub-questions:

RQ1: How are elements of project-based learning connected to students' professional identity development in a real-client, graduate instructional design course in Romania?

RQ1.1: How are elements of project-based learning manifested in the different stages of the course?

RQ1.2: To what extent are elements of students' professional identity developed in different stages of the course?

In order to answer these questions, I conducted a case study of an ID graduate course in Romania. I analysed the data twice, using each of the two components of the theoretical framework (presented in Chapter 2); I used the model of project-based learning defined by Jonassen (1999) to help analyse the design of the course, and the theoretical model of communities of practice developed by Wenger (1998) to make sense of the professional identity aspects. Each of these processes resulted in answers to the research sub-questions – presented in Chapters 5 and 6, respectively. Then, using the stages of the course as a guide, I examined the connections between elements of project-based learning and elements of professional identity development which I presented in the thematic analysis in Chapter 7.

8.3 Research findings

As discussed in Chapter 1, the instructional design field is going through changes towards alignment with more established design disciplines, by incorporating design thinking. In this context, the findings of this study are important in understanding how PjBL, as a traditional pedagogy in ID, contributes to the development of a professional identity that reflects the design orientation.

In this section, I will present a short answer to the main research question, building on the four themes presented in Chapter 7. The

interconnections between elements of PjBL and elements of students'
professional identity are illustrated in Figure 8.1.
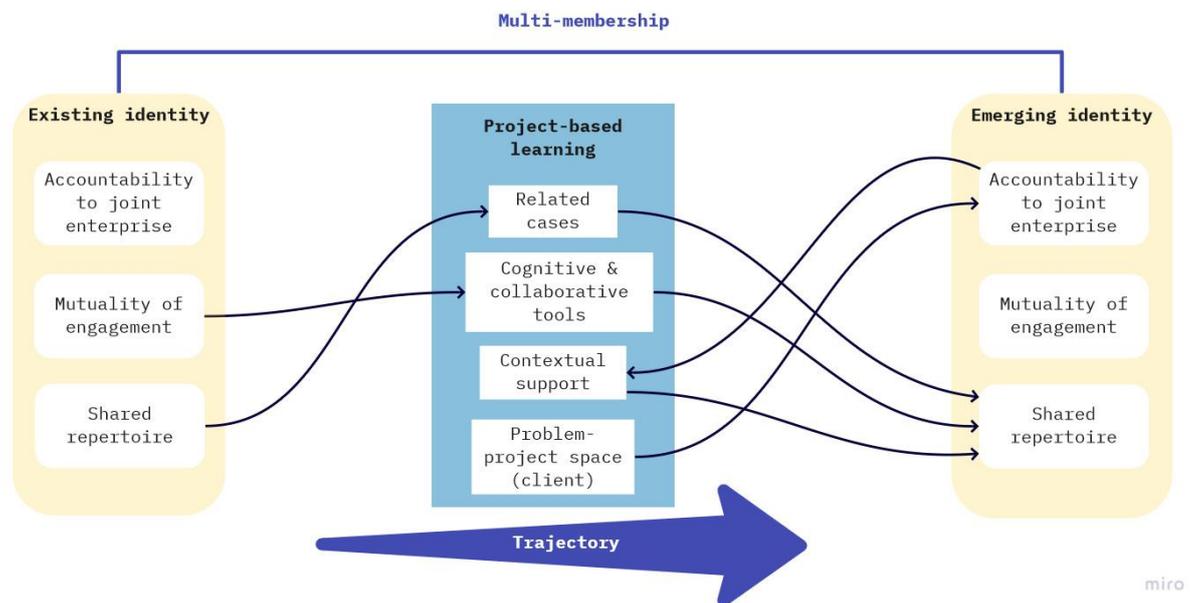
*Figure 8.1 - Connections between elements of PjBL and elements of students' professional
identity*

The data revealed that elements of students' existing identities were
influential in how they benefited from elements of the course design. For
instance, students' existing *repertoire* of reflection and problem-solving skills
influenced how they accessed and used their previous relevant experience
(*multi-membership)* or how they interpreted similar, solved cases provided by
the teacher (*related cases)*. Their different ways to engage in group work
(*mutuality of engagement*) impacted how they used *collaborative and cognitive
tools* – which would be part of their target *shared repertoire*.

Equally, elements of PjBL, such as including the client in the *problem-
project space*, by giving students the opportunity to consider constraints
together with requirements from teacher, clients, beneficiaries, as well as their
own beliefs and goals, influenced how they constructed their sense of
accountability to a joint enterprise, which in turn had effects on the *contextual
support* students needed once they saw themselves more as 'consultants' and
less as 'students'. These changes can be described in terms of students'
trajectories towards the identity of instructional designer, by considering how

their existing memberships to communities of practice (e.g., of students), together with elements of the course design, influenced their journey towards the new, designer identity targeted by the course.

The findings indicate multiple connections between the course design using project-based learning and students' professional identity development, spanning all elements. Moreover, the connections indicate reciprocal influences, in the sense that not only the course design (by implementing PjBL) influences the students' development of professional identity, but also the mechanisms of identity development have particular influences over how elements of the course are experienced by the students and teachers.

8.4 Limitations

My role as an insider researcher brings possible limitations, and also advantages – as discussed in Chapter 4, for this case study. Being the instructor of the course means I was heavily invested in it, emotionally and professionally. I addressed the concern on my objectivity by attending to the four trustworthiness criteria set by Lincoln and Guba (1985): credibility, dependability, confirmability and transferability. By using data, methodological, and time triangulation (see 4.2.3.3) I intended to increase credibility, although researcher triangulation could not be ensured and remains a limitation which I tried to address by analysing the data after distancing myself from it for a period of time. I also endeavoured to provide thick descriptions of the case, to enable other researchers and practitioners to judge transferability themselves; however, I found wordcount to be a significant obstacle; I intend to dedicate more space to individual aspects in further research articles. While I tried to ensure dependability by clearly documenting the research process and explaining the reasons behind methodology choices, I am aware that not all the specific details could be provided. Regarding confirmability of interpretations and findings, I included supporting data and strived to make my reasoning explicit; still, I acknowledge that these are my own interpretations which can be influenced by contextual factors of which I may be unaware. During the whole process, I kept a research diary, illustrated in Figure 8.2, which helped me in

questioning my assumptions, expressing my emotions and generally documenting the process.

Figure 8.2 - Excerpt from research diary

Regarding constraints, being the course instructor and researcher raised the additional challenge of time. Having to organize by myself the course, including its location sometimes, the meetings with clients, handling feedback and requests from multiple teams, as well as the research process, all of these on top of a full-time job in a different organization and other commitments, created difficulties that reflected both on the course and the research project, such as limiting the number of focus groups or limiting the processing of students' reflections. However, constraints are inevitable and I don't claim I conducted a perfect course, but instead I tried to be open about my choices in its presentation.

Finally, the way I engaged with theory and current research can be seen as bringing both advantages and challenges. As I described in Chapters 2 and 3, I used the theoretical framework to analyse the literature, which was not selected to match the theoretical concepts; this means that most interpretations regarding the association of the concepts to the examined literature belong to me, while the authors themselves might disagree. Still, providing new perspectives and connecting existing scholarship is equally a strength.

8.5 Contribution to new knowledge

As detailed in section 7.3, the results of this case study highlighted contributions to knowledge in three areas.

First, in relation to the literature on students' professional identity development in practice-based settings, my contribution highlights that including the client and the beneficiaries in the problem-project space can play a crucial role in the definition of the students' accountability to a joint enterprise without indiscriminately socializing them into the profession.

Second, in relation to knowledge about students' professional identity development in design disciplines, my contribution indicates that building students' own voices as designers requires interactions between all sources of accountability, including the client and beneficiaries. In addition, mutuality of engagement has a unidirectional influence over the way students use cognitive and collaborative tools, which, in turn, influence their shared repertoire. Finally, my contribution highlights that, at least for novice designers, it is presence of reflection skills that helps students move along the design trajectory and make sense of their multi-membership, not diversity of previous experience.

Third, in relation to knowledge about project-based learning in design disciplines, my contribution is to emphasize that including the client in the problem-project space has benefits both in terms of students' experience and course design (by decreasing need for contextual support). In addition, for students to benefit from this approach and reach the disciplinary learning goals (and not only transdisciplinary ones, such as metacognitive), this case study suggests that reflection and problem-solving skills are pre-requisites, as they enable students to use the elements of related cases and multi-membership to build their design precedents base, which is a crucial aspect in design education. Regarding cognitive and collaborative tools, the findings suggest that their use is influenced by how students choose to organize their work (as opposed to the tools and support influencing work organization), with teams choosing engagement by joint effort having a much richer use of tools than teams splitting the labour. Finally, the study indicates that students' need for

contextual support is influenced by the presence of the client – both directly (as the client offers cognitive support) and indirectly (because students need less affective support when they see themselves as consultants), potentially meaning that the teacher should instead focus more on metacognitive support for teamwork, reflection and problem-solving.

8.6   Implications for practice

The findings of this case study have implications for the practice of teachers, especially those responsible for courses in ID or other design-related disciplines, but also for those who implement project-based learning approaches, or other learning interventions in practice-based settings.   As I highlighted in sections 7.3.1.1 and 7.3.2.1, including the client in the project and orchestrating interactions with the students at least at the beginning and at the end of the projects has direct benefits for the students, especially for the novice ones.

Another way the findings can influence the practice is by suggesting that, in order to implement a successful (according to subject-related goals) project-based learning course, instructors first need to attend to reflection, problem-solving and teamwork skills. This can be done in a number of ways, one being to run an introductory PjBL module aimed at improving these skills (rather than disciplinary content). In terms of programme design, ensuring these skills are approached transversally across the courses requires a shared teaching strategy, including by promoting a better collaboration with the associate lecturers from the industry and offering more opportunities to integrate them into the departments.

In terms of implications for my own practice, I intend to continue using project-based learning in my teaching and to incorporate the findings into the course designs, by continuing to involve clients in the projects, by creating an introductory module to target specifically reflection, problem-solving and teamwork, and by implementing a more deliberate way to provide contextual metacognitive support for these during the project work. These changes would enable the students to benefit more from the PjBL approach and to focus more

on the design aspects of their professional development, such as creating a precedents base and reflection-in-action.

8.7   Implications for policy

Concerning implications for policies outlined in section 1.2, this study underlines the importance of reflection, problem-solving and teamwork, and supports the emphasis given by policy to these transversal skills from a perspective connected with employability. However, before becoming directly relevant in the workplace, these skills are highly relevant for the success of learning strategies, such as PjBL, which connect learning with working. Embedding these skills throughout the curriculum has the potential to facilitate a cascading learning effect, as well as provide the students with a diverse range of application contexts, contributing to their eventual transferability to the workplace.

Highlighting the importance of clients' involvement in students' projects has implications for policies related to the establishment of permanent partnerships between universities and industry. In this respect, bringing practitioners to teach and taking students to clients can be seen as two sides of the same coin. While in some disciplines these partnerships are hardly a new practice, in others it might prove more difficult to implement and additional support structures might need to be established in order for faculty to engage successfully with the industry partners.

8.8   Implications for future research

As an exploratory case study, this research opens the discussion on several issues related to its findings.

First, while I suggest that clients' involvement in the project is beneficial to students, further research would be helpful in clarifying the conditions necessary to make the most out of clients' presence and to integrate their participation with that of other relevant stakeholders.

Second, the finding that teamwork by joint effort, as opposed to dividing labour, influences how cognitive tools are used by the students, is one that I wish to investigate further in targeted studies, to describe more precisely the types of engagement as well as the use of the tools, and to examine the role of collective reflection in the relationship between type of engagement and use of cognitive tools.

Third, building on my comments in 8.7 regarding the significance of reflection, problem-solving, and teamwork skills as pre-requisites for engaging successfully in PjBL, further empirical and theoretical research is needed to connect this insight with the scholarship on transversal skills, which is currently very much upheld at EU policy level, but critiqued at theoretical level as being less context-free than presumed by proponents. Connecting these so-called generic skills with identities might offer a more balanced view and a more useful platform for field implementations.

Finally, the findings can open a new perspective in the debate between socializing students into professions, with the goal of increasing employability, and equipping them with the tools to develop a critical stance on their chosen profession. Instead of having to choose between the views of established community members and the views of university mentors, students could use identity mechanisms to construct their own sense of responsibility by interacting with a wider array of stakeholders (especially clients and beneficiaries) in the projects or internships students undertake. This is an issue I intend to explore in an upcoming article.

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Appendix A – Invitation to participate

My name is Ioana Hartescu and I am a member of the teaching staff at the University of Bucharest, as well as a doctoral student in the Department of Educational Research at Lancaster University.

I am working on a research project on students' development as instructional designers in a project-based learning graduate course. It involves students enrolled in "Blended Learning. Training Applications" – a compulsory course offered to first year master students.

As a student in the "Blended Learning. Training Applications" course, I wish to invite you to participate in my research project concerning your experience of project-based learning in instructional design. Please read this form carefully, and feel free to ask any questions you might have. You can contact me with questions by e-mail at [contact information].

If you agree to take part in the study, you will fill in several questionnaires regarding your experience of the course and participate in maximum two focus groups or interviews, taking approximately 40 - 60 minutes each.

When I have completed transcribing the recordings of the focus groups and interviews, I will e-mail you a copy of the transcript of our discussion if you request it. If you are comfortable with the content of the transcript, please reply to me by email as soon as possible to let me know. If not, you may add, revise, or delete information from the transcript as you see fit.

Other sources of data include activities which are normally part of the course: recordings or observations from workshops and meetings, excerpts from your written reflections, intermediary work and final presentations. Although you will be required to do these as part of your course duties, if you do not agree to take part in the research, the data you provide will not be used for the purposes of this study.

The data from this study will be used in my doctoral thesis, and may be published and presented at conferences. To safeguard your confidentiality and anonymity, you will be given a pseudonym, and all information that can lead to your identification will be removed.

The audio recording and transcript of our discussions and meetings will be safely stored and encrypted, as will your contact information. You may withdraw

from the study for any reason, at any time, without penalty of any sort. If you withdraw from the study at any time, any data that you have contributed will be destroyed.

If you have any concerns or questions about me or the research you can contact my supervisor at Lancaster University at [contact information].

Consent to participate

I have read and understood the description provided above; I have been provided with an opportunity to ask questions and my questions have been answered satisfactorily. I consent to participate in the study described above, understanding that I may withdraw this consent at any time.

Signed   Date

Appendix B – Questionnaire

[Introduction]

Welcome to the course "Blended Learning. Training Applications"!

My name is Ioana Hartescu and I will be your tutor for this course. You can find more information about me here [LinkedIn profile]. During this semester, we will use a project-based learning approach: working in small teams of 3 – 4 students, you will create e-learning modules for real clients.

Please answer the following questions about you, your experience and expectations related to this course. There are no right or wrong answers. Answering truthfully helps me know you better and tailor my approach to your needs.

[Questions]

Indicate your gender (M/F)

Your age is:

Under 25

25 – 35

35 – 45

Over 45

Describe your studies so far (higher education, other certificates and professional training).

Do you currently work? (Y/N)

If yes, indicate whether part-time or full-time.

How many years of working experience do you have?

Briefly describe your professional experience.

Describe your experience as trainer (topics, audiences, frequency).

Have you ever used project-based learning before? (Never, Rarely, Often, Very often)

Describe a representative instance of project-based learning from your academic studies.

What do you think are some of the strengths and challenges of project-based learning?

What is your experience of using educational technology? (Never / rarely / sometimes / often)

I used e-learning platforms as a student.

I used e-learning platforms as a teacher / trainer.

I created interactive content for online learning.

I wrote on educational discussion forums.

I moderated discussions on educational forums.

I wrote on educational blogs.

I took online tests (except the driving license test).

I searched for and downloaded educational resources.

I took part in webinars.

I worked with others to create wikis or other types of collaborative documents.

I participated in chat discussions with a learning purpose.

I submitted learning assignments and received feedback via an online platform.

I used augmented reality applications.

What are your expectations for this course in terms of your professional development?

Do you anticipate any difficulties or challenges in completing this course successfully? Which ones?

What do you need (in terms of support, resources, etc) to overcome these and complete this course successfully?

Any other comments or questions or things you want me to know.

[Submit]

Thank you for filling in this questionnaire! Looking forward to meeting you in class!

Appendix C – Focus group protocol

[Introduction]

Hello and thank you for agreeing to participate in this focus group. I remind you that you signed a consent form at the beginning of the class, agreeing to take part in this research. If you want to review it before we begin, I have here a copy.

The aim of the focus group is to explore your thoughts and experiences related to this course, your role as instructional designer, how your project is coming along, how do you find working with educational technology. There are no right or wrong answers to the questions. I am interested in your views and your experience. I will ask guiding questions but you don't have to direct your answer to me, you can talk to each other. The basic rules are not to speak over each other and to be polite even when you disagree with each other.

This focus group will last 30 minutes. I will audio record our discussion and, after I transcribe it, I can send the script to you, if you request it.

[Questions]

How is your project going?

What challenges did you encounter? What is going well? What is not?

How can I support you further?

How are you using the authoring tools?

How do you see yourself in the instructional designer role?

And compared to the beginning of the course?

What are your thoughts about the instructional design process?

What would you change about this course?

[Thank you and closing]

Appendix D – Semi-structured interview protocol

In addition to the questions listed below, follow-up prompts will be used to probe the issues that arise.

[Introduction]

Hello and thank you for agreeing to this interview.

The aim of the interview is to explore your thoughts and experience related to your participation in the Blended Learning course. There are no right or wrong answers to the questions. I am interested in your views and your experience.

This interview will last 40 to 60 minutes. I will audio record our discussion and, after I transcribe it, I can send it to you, if you request it.

[Questions]

How were your expectations met by this project? Did your initial expectations change in any way during the process?

What are your impressions about the students' presentations, compared to your expectations at the beginning?

How do you see the students now, compared to the first meeting?

How well do you think the students understood the profile of the target group? How can we improve that?

How would you comment on the collaboration with me and the students during this semester?

What would you change if we did the project again?

Would you like to add anything else?

[Thank you and closing]