Strengthening the ties between theory and practice in higher education

Strengthening the ties between theory and practice in higher education: an investigation into different levels of authenticity and processes of re- and de-contextualisation

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Abstract. Although many attempts have been made to clarify how academic knowledge can be used in practice, there are not many empirical results that shed light on the process of developing academic knowledge from practical experience. The aim of this study is to examine to what extent an authentic learning environment supports master students in both processes of re and de-contextualisation. We used a qualitative and quantitative research method to evaluate the impact of learning environments that differed on the level of authenticity (less and more authentic). Participants described both learning environments as being instructive and realistic. We found strong correlations between motivation for learning, perception of authenticity and perception of experiential learning. Results suggest that more authenticity seems to 1) facilitate experiential learning, and 2) strengthen the ties between theory and practical learning experience. Additional implications for including reflective and collaborative elements to further support learning are discussed.

Keywords: Authenticity, Experiential learning, Re-contextualisation, De-contextualization, Higher education

1. Introduction

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

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

1.1 Experiential learning

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

CE). At the same time, new knowledge can arise from gaining concrete learning experience and be converted into abstract generalizations (de-contextualising knowledge, RO, AC) (Hennissen et al., 2017), but also from applying this new generic knowledge in other learning experiences (re-contextualising knowledge, AE, CE) (Lindsey & Berger, 2009; Orland-Barak & Yinon, 2007). Holman et al. (1997) and Tynjälä et al. (2003) stressed that in this way learners are involved in a deeper and more meaningful understanding.

1.2 Authenticity as a pillar of experiential learning

According to many researches, authenticity forms the core of pedagogic approaches that stimulate relations between concrete learning experience and knowledge (Ashford-Rowe et al., 2014; Gulikers et al., 2004; Lautenbach, 2014; Villarroel, 2018). This is further confirmed by a review study by Radović et al. (submitted 2019a) that found elements of authenticity to be essential for designing experiential learning environments.

Authenticity in learning is defined by the extent to which professional situations are reassembled in the learning environment (Ainsworth et al., 2012; Gulikers et al., 2004, 2008; Newmann et al., 1995). This may include a physical or virtual environment with all complexity and limitations of professional context (Gulikers et al., 2004; Reeves et al., 2002). However, authentic learning happens when learners use professional tools, knowledge and skills, and try to imitate behaviour of experts. Gulikers et al., (2004, 2008) discuss five dimensions of authenticity that need to be reflected in the learning environment, namely 1) *the task* that resembles the complex inquiry; 2) *the physical context* that reflects the way knowledge, skills, and attitudes will be used in professional practice; 3) *the social context* that considers social processes that are present in real-life contexts; 4) *the assessment* that involves multiple indicators of learning; and 5) *the criteria* based on standards used in the real-life situation.

While authenticity provides students with real world resources and professional tools, it can also support students to develop knowledge by generalising professional situations. In that respect, Radović et al. (submitted 2019b) point out elements that need to be considered when designing learning that facilitates processes of re- and de- contextualisation. Their mARC instructional model (more Authentic, Reflective, and Collaborative) suggests that the design of authentic learning should include: *1) tasks with a high interdependence between theoretical inquiry and concrete learning experiences* (reflecting the complexity of professional situations); to *2) demonstrate skills and knowledge by creating a significant*

product and build understanding; over *3) a sustained period of time*; to support *4) the variability of experiential learning activities without rigidness of the fixed learning patterns*; in order to *5) elicit higher order thinking and stimulate a wide range of cognitive strategies* (including elaboration, analysis, organisation or deduction). While authentic tasks need to be complex enough to challenge learners, the learning process furthermore should include: 6) *shared work and collaboration activities* with peers and community of practice, to mimic activities of experts and professionals; *7) theoretical knowledge as a tool to understand a concrete learning experience (re-contextualisation)*; and should ensure that *8) students engage in generalisation processes in order to associate meaning from experience with a broader context of knowledge (de-contextualisation)*. By further explaining these guidelines, Radović et al., (submitted 2019b) stress the importance of strengthening the ties between theory-based courses and practice learning experience.

1.3 The pearls and perils of authenticity

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

However, designing authentic learning environments presents certain challenges (Villarroel, 2018). There are several perils which may hinder integrating professional situations and fail to use (teach) experts skills within a formal higher education setting (Ashford-Rowe et al., 2014; Lautenbach, 2014). Gulikers et al. (2004, 2008) and De Bruyckere (2017) assert that authenticity is a subjective concept, placed in the eye of the beholder. Empirical research has shown that it could be difficult for learners to structure experience and focus on developing understanding (Leijen et al., 2014). Similarly, hindrances occurred when programs did not provide "real" experiences (Aiken & Day, 1999; Larsen et al., 2017; Lautenbach, 2014) or when students perceive learning as being too time and energy consuming (Hramiak et al., 2009). The challenging aspects of authenticity are also reflected in

the fact that the effects of authenticity depends on the way the learning process is designed (Radović et al., submitted 2019a).

2. Research questions for this study

The research reported here departs from two key postulates when designing authentic learning environments, and considers all the "pearls and perils" of authenticity. The first postulate is that aligning the learning task with the professional proximity can be done based on Gulikers et al.'s (2004) five-dimensional framework. The second postulate is that instructional elements of authenticity, distilled from the mARC model, can be used to enhance both processes of re- and de- contextualisation within experiential learning (Radović et al., submitted 2019a). Both the framework of Gulikers et al. (2004) and the mARC model of Radović et al. (submitted 2019b) argue that authenticity can be seen as a continuum and not as a dichotomy.

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

1. Are different levels of authenticity related to academic achievement?
2. Are different levels of authenticity related to motivation, enjoyment, perceived competences and usefulness, and perception of authenticity?
3. Are different levels of authenticity related to students engagement into re-contextualisation (AE & CE) and de-contextualisation (RO & AC)?
4. Are various demographic characteristics related to motivation, perception of authenticity, experiential learning, and academic achievement?

3. Method

To investigate our research questions, we used triangulation of both quantitative and qualitative research methods with respective statistical techniques. A less and more authentic learning environments were designed (to be further explained in 3.3 Context of the study) and participants could choose one of the designs. Multiple data sources were used: course essay assessment as a measure of academic performance; a post-test questionnaire with measures

on motivation, perception of authenticity and experiential learning; and debriefing activities to get more qualitative insight in the learning process and opinions of participants. Ethical approval for this study was granted by the Ethics Review Committee of the Open University of the Netherlands.

3.1. Participants

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

Participants of this study were students of one cohort who completed the course on time and gave written consent to participate in the study (n = 37). Table 1 provides a comprehensive picture of the demographics collected with a questionnaire (six students did not fill in the questionnaire). Participants were divided into two groups based on their choice, further specified as LA (Less Authentic condition) and MA (More Authentic condition) groups as the learning task differed in the extent of authenticity incorporated in course design

Table 1. *Students' demographic information*

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

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

3.2. Measuring instruments

3.2.1. Academic performance

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

3.2.2. The questionnaire

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

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

3.2.3. The debriefing session

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

3.3. Context of study

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

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

mARC implemented to facilitate both processes of re- and de- contextualization within experiential learning.

For this study, the course was implemented in two variants that differed in the way authenticity of the learning environment was conceptualized. Table 2 demonstrates the differences from the authenticity perspective (on three of five 5DF dimensions, with Assessment and Criteria being the same for both conditions).

Table 2. *Authenticity of the learning environment as conceptualized in the present study based on framework by Gulikers et al. (2004).*

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

While MA students had freedom to choose a classroom learning situation to observe, who and how to conduct interviews, and which school documents to analyze, LA students were offered pre-selected observation, interview, and materials. As a consequence, the dimension of 'task authenticity' for tasks the learner had to carry were different. Furthermore, the dimension of 'physical context' varied between two variants of the course because of a) dissimilarity to work environment (e.g., organizing research and collection data in real practice), b) availability of resources (e.g. variety of resources, being able to choose the set of documents, or chose the set of literature), and c) differences regarding time constrains and limits (Gulikers et al., 2004). Aspects of 'social context' also differed between LA and

MA, as a direct consequence of different social interactions (organizing observations, making arrangements with people in charge of affairs, and planning interviews), and a positive interdependence on the members of the school and the teacher.

Constrained by the educational vision, rules of examination and ethical issues of our university, we were not in a position to make greater difference, therefore the last two dimensions of authenticity (results and criteria) were the same in LA and MA. Course 'results' were measured on performance which covered a variety of professional skills and multiple indicators of work (developing an instrument based on theoretical assumptions, creating a poster, giving an oral presentation during a virtual conference, and writing a scientific essay). Finally, course 'criteria' were related to the assessment of the poster presentation and the scientific essay. This included standards and requirements that are similar for the evaluation of work in professional situations, like for journal or conference paper reviews.

4. Results

The internal consistency of each sub-scale of the questionnaire was calculated using Cronbach's α statistics (Cronbach, 1984; Taber, 2017). By looking in Table 3, four dimensions (with low numbers of items) were reliable with α values between .58 and .7, two dimensions had adequate reliability above .7 and four dimensions had high reliability above .8. As indicated in earlier works (Cho & Kim, 2015; Taber, 2017), scores that have a low number of items associated with them, as well as non-normally distributed data, tend to have lower reliability. Thus, subscales achieved sufficient internal consistency.

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

4.1. Correlation analysis of questionnaire dimensions

A Spearman's rank-order correlation was run to determine the relationship between the subscales of the questionnaire. Our analysis suggest that 26 correlations between subscales of the questionnaire were statistically significant. The results of the complete correlation analysis are presented in Table 3. Furthermore, a two-tailed test of significance indicated that there was a strong and positive correlation between overall subscale of motivation (IMI), authenticity (5DF) and experiential learning (EXP). Increases of overall motivation were correlated with increases of overall perception of authenticity $r_s(29) = .61$, $p < .01$, and overall experiential learning $r_s(29) = .73$, $p < .01$. Finally, the higher students' perceived the overall authenticity, the more they were able to engage with experiential learning $r_s(29) = .54$, $p < .01$.

Table 3. *Cronbach's α and Spearman's rank-order correlations (n = 31)*

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

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

4.2. Academic achievement

The Mann-Whitney U revealed no significant effect of level of authenticity on the academic achievement, although we see tendency that participants in MA group scored higher than participants in the LA group on each of the evaluation criteria (Table 4).

Table 4. *The learning effects on the academic achievement of participants in LA and MA groups*

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

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

The Mann-Whitney U tests were repeated for within-subjects measures of *Age*, *Education*, *Experience* and *Expertise*. The results of the additional analysis showed that academic achievement of older students was significantly higher than achievement of younger students (U = 39, p = .047). It can also be concluded, that the final grades of students with more experience were significantly higher than the final grades of the less work experienced students (U = 30, p = .031). Furthermore, there were no effects of education or expertise on the final grade (Table 5).

Table 5. *Analysis of the relation between demographic characteristics and academic achievement measured with Final grade*

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

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

4.3. Differences in rating of motivation, authenticity and experiential learning

Table 6 illustrates the means and standard deviations of motivation, perceptions of authenticity and experiential learning between LA and MA group. The higher ranking of all subscales was on face value present in MA group (when compared to LA group). To evaluate whether these differences were statistically significant, the Mann Whitney U tests were used (Table 7).

Table 6. *Means and standard deviations of each subscale of the questionnaire*

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

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

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

Table 7. *Effects of authenticity on motivation, perceptions of authenticity and experiential learning*

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

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

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

On the contrary, there was no statistical effect of different levels of authenticity found on the de-contextualisation process of experiential learning. Although, this can be the consequence of the "ceiling effect", as both LA and MA students scored very high. That becomes evident from Table 6, where Means (Standard deviation) regarding the sub-construct of Abstract conceptualization (AC) were 6.07 (.62) for LA, and 6.17 (.39) for MA students.

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

4.4. Analysis of the debriefing sessions

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

- *The assignment was instructive and especially interesting because you get a feel for the theory, learn to recognize the concepts in a real situation and also learn to write an article. All concepts are present and you are given many tools to work*

with the (many) theory and to organize it in such a way that it becomes logical (Student 13, LA).

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

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

- *It is interesting to link theory to practice and practice to scientific writing. I still find this very difficult, so a good learning process* (Student 8, LA).
- *I could combine the theory and my practical experience to carry out the assignment* (Student 26, LA).
- *Although I have a lot of observation experience; yet from a larger learning-theoretical framework it was a new experience. It helps to try to connect practice and theory* (Student 9, MA).

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

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

5. Discussion and Conclusion

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

Regarding the first research question, it should be noted the difference between the grades were not statistically significant. Our additional analysis shows that students in a more authentic environment perceived higher overall authenticity then students in a less authentic environment. Although the variance between the two learning environments was only manifested in three of the five dimensions of the Gulikers et al.'s (2004) framework, it seems that this was sufficient enough for students to perceive the difference in overall authenticity. However, the variance was not big enough to discovery significant effect on grades with a small sample of only 37 participants. Furthermore, we found that different students demographics (such as achievement, age, education, work experience, and professional expertise) did not influence the students' perception of authenticity. These results indicate that two levels of authenticity were designed in such way to be independent of students' demographics. This resulted to some degree in answering the long standing issue about how to effectively persuade learners in higher education programs that they are learning in an authentic environment (Herrington et al., 2000; 2007). It can be concluded that aligning the learning task with the professional proximity can be successfully done based on Gulikers et al.'s (2004). In addition, we propose educators to design authentic tasks according to all five dimensions of authenticity, and most importantly, to incorporate a higher level of authenticity in each of the dimensions.

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

Regarding the third research question, whether students were able to engage in the steps of Kolb's cycle, the research results are in favour of more authenticity. These results indicate that designing the authentic learning task to facilitate experiential learning (and both processes of re-contextualisation and de-contextualisation), can be successfully done following the eight principles of the mARC model (Radović et al., submitted 2019b), as introduced in the theoretical section of this article. Students in MA scored significantly higher than students in LA on the Re-Contextualisation sub-construct, indicating that more authenticity 1) gave them more practical experience to help construct theoretical concepts and 2) involved them in testing ideas and experimenting with the course concepts. No difference,

was found on the De-Contextualisation sub-construct. Two possible explanations exists for these findings. First, the Abstract conceptualization step (EXP.AC) was rated equally and very high across two groups (see Table 6). Second, insights from the debriefing sessions indicated that students do not clearly generalise from these practical learning experiences. Our data suggest that students' awareness of the re-contextualization process seems to occur more often than awareness of processes of de-contextualization. This could be the consequence of the re-contextualisation practice in their previous education (within teacher education institutes where students practice theory, rather than theorising practice). Following discussion will provide recommendations for future studies on this subject.

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

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

Our discussion raised two interesting recommendations for future studies needed to be examined in particular. First, it must be emphasised that authentic environments in this study encompassed reflection learning processes, although this was not a dominant learning strategy used. According to Elvira et al. (2017) and others, reflection should be an important aspect of

the learning process for students to develop higher-order thinking skills, and an ability to generalize from learning experience and rationalize decisions made in regard to the developed understanding and previous beliefs. Boud et al. (1985, p. 19) wrote that reflection does not happen alone, rather learners must be supported to "explore their experiences in order to lead to new understanding". Moreover, the lack of critical reflection on the relevant learning experiences can hinder the process of developing understanding and generalisation form practical experience. Following these conclusions and according to our results, future research should investigate to what extent critical reflection activities can be included to further support students generalisation and abstracting; rather than just having a perception of engaging into process of de-contextualisation.

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

References

Ainsworth, H., Gilchrist, M., Grant, C., Hewitt, C., Ford, S., Petrie, M., Torgerson, C. J., & Torgerson, D. J. (2012). Computer-based instruction for improving student nurses' general numeracy: Is it effective? Two randomised trials. *Educational Studies, 38*(2), 151-163.

Aiken, I. P., & Day, B. D. (1999). Early field experiences in pre -service teacher education: Research and student perspectives. *Action in Teacher Education*, *21*(3), 7-12.

Ashford-Rowe, K., Herrington, J., & Brown, C. (2014). Establishing the critical elements that determine authentic assessment. *Assessment & Evaluation in Higher Education, 39*(2), 205-222.

Boud, D. Keogh, R. & Walker, D. (1985) *Reflection: turning experience into learning*. London: Kogan Page.

Brown, J. S., Collins, A., & Duguid, P. (1989). Situated cognition and the culture of learning. *Educational Researcher, 18*(1), 32-42.

Cho, E. & Kim, S. (2015). Cronbach's coefficient alpha: Well-known but poorly understood. Organizational Research Methods, *18*, 207-230.

Clara M., Mauri, T., Colomina, R., & Onrubia, J. (2019). Supporting collaborative reflection in teacher education: a case study. *European Journal of Teacher Education, 42*(2), 175-191.

Cochran-Smith, M., & Lytle, S. L. (1999). Relationships of knowledge and practice: Teacher learning in communities. *Review of Research in Education, 24,* 249-305.

Darling -Hammond, L., & Snyder, J. (2000). Authentic assessment of teaching in context. *Teaching and Teacher Education, 16*, 523-545.

De Bruyckere, P. (2017). *Authenticity Lies in the Eye of the Beholder: The Perception of Teachers' Authenticity by their Students*. Open Universiteit of The Netherlands, PhD Thesis.

Dewey, J. (1938). *Experience and education*. New York: Collier Books.

Elvira, Q., Imants, J., Dankbaar, B., & Segers, M. (2017). Designing Education for Professional Expertise Development. *Scandinavian Journal of Educational Research, 61*(2), 187-204.

Eraut, M. (1995). Schön Shock: A case for reframing reflection in action? *Teachers and Teaching: Theory and Practice, 1*(1), 9-22.

Even, R. (1999). Integrating academic and practical knowledge in a teacher leaders' development program. *Educational Studies in Mathematics, 38*, 235-252.

Green, S. B., & Salkind, N. J. (2008). Using SPSS for Window and Macintosh: Analyzing and understanding data (5th ed.). Upper Saddle River, NJ: Pearson Prentice Hall

Gulikers, J. M., Bastiaens, T. J., & Kirschner, P. A. (2004). A five-dimensional framework for authentic assessment. *Educational Technology Research and Development*, *52*(3), 67-86.

Gulikers, J. T. M., Bastiaens, T. J., Kirschner, P. A., & Kester, L. (2008). Authenticity is in the Eye of the Beholder: Student and Teacher Perceptions of Assessment Authenticity. *Journal of Vocational Education and Training*, *60*(4), 401-412.

Harford, J., & MacRuairc, G. (2008). Engaging student teachers in meaningful reflective practice. *Teaching and Teacher Education*, *24*(7), 1884-1892.

Hegender, H. (2010). The Assessment of Student Teachers' Academic and Professional Knowledge in School Based Teacher Education. *Scandinavian Journal of Educational Research*, *54*(2), 151-171.

Hennissen, P., Beckers, H., & Moerkerke, G. (2017). Linking practice to theory in teacher education: A growth in cognitive structures. *Teaching and Teacher Education*, *63*, 314-325.

Herrington, J., & Kervin, L. (2007). Authentic learning supported by technology: Ten suggestions and cases of integration in classrooms. *Educational Media International*, *44*(3), 210-236.

Herrington, J., & Oliver, R. (2000). An instructional design framework for authentic learning environments. *Educational Technology Research and Development*, *48*(3), 23-48.

Holman, D., Pavlica, K., & Thorpe, R. (1997). Rethinking Kolb's theory of experiential learning: The contribution of social constructivism and activity theory. *Management Learning*, *28*, 135-148.

Hramiak, A., Boulton, H., & Irwin, B. (2009). Trainee teachers' use of blogs as private reflections for professional development. *Learning, Media and Technology*, *34*(3), 259-269.

Hursen, C. (2016). The impact of curriculum developed in line with authentic learning on the teacher candidates' success, attitude and self-directed learning skills. *Asia Pacific Education Review*, *17*(1), 73-86

Jansen in de Wal, J., den Brok, P., Hooijer, J., Martens, R., & van den Beemt, A. (2014). Teachers' engagement in professional learning: Exploring motivational profiles. *Learning and Individual Differences*, *36*, 27-36.

Klaeijsen, A., Vermeulen, M., & Martens, R. (2018). Teachers' Innovative Behaviour: The Importance of Basic Psychological Need Satisfaction, Intrinsic Motivation, and Occupational Self-Efficacy. *Scandinavian Journal of Educational Research*, *62*(5), 769-782.

Kolb, D. (1984). *Experiential learning: Experience as the source of learning and development*. Englewood Cliffs, NJ: Prentice-Hall.

Kolb, D. (2015). *Experiential Learning: Experience as the Source of Learning and Development*. Upper Saddle River, NJ: Pearson Education.

Korthagen, F. A. J., & Kessels, J. P. A. M. (1999). Linking theory and practice: Changing the pedagogy of teacher education. *Educational Researcher*, *28*(4), 4-17.

Kreber, C. (2001). Learning experientially through case studies? A conceptual analysis. *Teaching in Higher Education, 6*(2), 217-228.

Larsen, C., Walsh, C., Almond, N., & Myers, C. (2017). The "real value" of field trips in the early weeks of higher education: the student perspective. *Educational Studies, 43*(1), 110-121.

Leijen, Ä., Allas, R., Toom, A., Husu, J., Mena, J., Meijer, P., ... (2014). Guided reflection for supporting the development of student teachers' practical knowledge. *Procedia - Social and Behavioural Sciences*, *112*, 314-322.

Leinhardt, G., McCarthy Young, K., & Merriman, J. (1995). Integrating professional knowledge: The theory of practice and the practice of theory. Learning and Instruction. *The Journal of the European Association for Research on Learning and Instruction*, *5*, 401-408.

Lindsey, L., & Berger, N. (2009). Experiential approach to instruction. In C. M. Reigeluth and A. A. CarrChellman (Eds.), *Instructional-design theories and models: Building a common knowledge base* (Volume III, pp. 117-142). New York, NY: Taylor and Francis.

Martens, R., Bastiaens, T., & Kirschner, P. (2007). New Learning Design in Distance Education: The impact on student perception and motivation. *Distance Education, 28*(1), 81-93.

McElduff, F., Cortina-Borja, M., Chan, S. K., & Wade, A. (2010).When t-tests or Wilcoxon-Mann-Whitney tests won't do. *Advances in Physiology Education, 24*, 128-133.

Newmann, F. M., Secada, W. G., & Wehlage, G. G. (1995). A guide to authentic instruction and assessment: Vision, standards, and scoring. Madison: WCER.

OECD (2019). Envisioning the Future of Education and Jobs: Trends, Data and Drawing. OECD Publishing, Paris, http://www.oecd.org/education/Envisioning-the-future-of-education-and-jobs.pdf

Oonk, W. (2009). *Theory-enriched practical knowledge in mathematics teacher education*. Leiden: ICLON PhD dissertation series.

Orland-Barak, L., & Yinon, H. (2007). When theory meets practice: What student teachers learn from guided reflection on their own classroom discourse. *Teaching and Teacher Education, 23*(6), 957-969.

Radović, S., Hummel, H. G.K., & Vermeulen, M. (2019a). *The Challenge of "More" Experiential Learning in Master of Education: Systematic Literature Review*. Manuscript submitted for publication.

Radović, S., Hummel, H. G.K., & Vermeulen, M. (2019b). *The mARC instructional design model for more experiential learning in higher education: theoretical foundations and practical guidelines*. Manuscript submitted for publication.

Reeves, T., Herrington, J., & Oliver, R. (2002). *Authentic activities and online learning, in Quality Conversations*. Proceedings of the 25th HERDSA Annual Conference, Perth, Western Australia, 7-10 July 2002: pp 562-567.

Roberts, J. (2018). From the Editor: The Possibilities and Limitations of Experiential Learning Research in Higher Education. *Journal of Experiential Education*, *41*(1), 3-7.

Ryan, R. M., & Deci, E. L. (2000). Intrinsic and extrinsic motivations: Classic definitions and new directions. *Contemporary Educational Psychology, 25*, 54-67.

Smith, R. (1992). Theory: An entitlement to understanding. *Cambridge Journal of Education*, 22 (3), 387-398.

Stenberg, K., Rajala, A., & Hilppo, J. (2016). Fostering theory-practice reflection in teaching practicums. *Asia-Pacific Journal of Teacher Education*, *44*(5), 470-485.

Taber, K. S. (2017). The use of Cronbach's alpha when developing and reporting research instruments in science education. *Research in Science Education,* 1-24.

Tynjälä, P., Välimaa, J., & Sarja, A. (2003). Pedagogical perspectives on the relationships between higher education and working life. *Higher Education*, *46*(2), 147-166.

van Schaik, P., Volman, M., Admiraal, W., & Schenke, W. (2018). Barriers and conditions for teachers' utilisation of academic knowledge. *International Journal of Education Research*, *90*, 50-63.

Villarroel, V., Bloxham, S., Bruna, D., Bruna, C., & Herrera-Seda, C. (2018). Authentic assessment: creating a blueprint for course design, *Assessment & Evaluation in Higher Education, 43*(5), 840-854.

Westbury, I., Hansén, S. E., Kansanen, P., & Björkvist, O. (2005). Teacher education for research-based practice in expanded roles: Finland's experience. *Scandinavian Journal of Educational* Research, *49*(5), 475-485.

Young, M., Caudill, E., & Murphy, W. (2008). Evaluating experiential leaning activities. *Journal for Advancement of Marketing Education,* 13, 28-40.