Will W. K. Ma   *Editor*

Engaged Learning and Innovative Teaching in Higher Education

Digital Technology, Professional Competence, and Teaching Pedagogies

Springer

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Foreword

In the dynamic landscape of digital learning environments, the importance of student engagement cannot be overstated. It is a fundamental catalyst for achieving optimum learning outcomes, particularly in the obtainment of twenty-first century competencies and skills. Unlike conventional classrooms, digital learning environments provide ample resources, interactive tools, and collaborative platforms that have the potential to elevate the educational experience. Student engagement in this context goes beyond mere participation; it becomes the foundation for fostering critical thinking, creativity, collaboration, communication, and digital literacy—the very skills essential for success in the twenty-first century.

Active student engagement in the digital space is instrumental in developing a learner-centred teaching approach, allowing students to take ownership of their educational journey. When students are actively involved in the learning process, whether through interactive multimedia content, virtual discussions, or collaborative projects, they are not just recipients of information but active constructors of knowledge. This participatory approach not only enhances their understanding of subject matter, but also improves their problem-solving skills, adaptability to new technologies, and ability to collaborate with peers across geographical boundaries. In the digital learning environment, student engagement serves as a driving force behind the acquisition of these competencies, transforming learners into skilled and empowered individuals prepared for the challenges and opportunities of the modern world.

This book, which is a collection of ideas and methods on "Engaging Learning and Innovative Teaching," is not only a priceless resource, but also emphasises how crucial it is to foster student engagement and active learning in the context of the modern educational paradigm. The importance of student engagement for the accomplishment of educational goals is demonstrated in Part I, *Innovative and Digital Learning Environments*. Upon exploring the transformative power of educators in preparing students for the VUCA world, it becomes clear that creating engaging learning experiences is essential to helping students become resilient and adaptive learners. Furthermore, studying how gamification and artificial intelligence may

be incorporated into Chinese higher education highlights the necessity for creative teaching strategies that grab students' interest and encourage active engagement. For educators and institutions alike, this part is essentially a strong call to action to emphasise and improve student engagement as a critical element of efficient and forward-thinking teaching practises.

The following parts of this book highlight the importance of student engagement, which is a recurrent theme in peer learning, digital marketing education, diagnostic radiography, vocational education, engineering competency, and curriculum design. Every chapter not only showcases cutting-edge techniques, but also highlights how much these techniques affect student engagement, emphasising how important student participation and active engagement are to the success of any educational project.

Therefore, this book is more than just a compilation of academic works; it is a strong recommendation for educators, administrators, and legislators to give student engagement initiatives top priority. As a result, we all acknowledge that developing engaging, participatory, and meaningful learning opportunities that enable students to flourish in the complexity of the twenty-first century is essential for the future of education.

Jakarta, Indonesia   Prof. Tian Belawati
2023

Prof. Tian Belawati has been working in the field of open and distance education (ODE) for over 30 years. She has had extensive experience in research, teaching, and administration of a large-scale open university system, for which she served as Rector from 2009 to 2017. She has also been involved in many international ODE movements that have led her appointments as President of the Asian Association of Open Universities or AAOU (2009–2010) and of the International Council for Open and Distance Education or ICDE (2012–2015), as a member of Board of Directors of the Open Education Consortium (2017–2019), a member of ICDE Board of Trustees (2017–2020), and a member of ICDE Control Committee (2021–present). Professor Belawati also serves as Chief Editor as well as a member of the Editorial Boards of several national and international journals.

Preface

This edited collection aims to create a global community of practise to share research papers on innovative teaching in order to solve the issue of engaged learning in higher education.

Higher education's core purpose is to enhance student participation and engagement in learning, specifically through encouraging students to apply a deep approach to learning. On the contrary, research findings show that most undergraduate students' learning orientations become increasingly surface and decreasingly deep. In order to foster engaged learning, it is critical to seek collaborative effort in the study and analysis of creative curriculum design, innovative teaching pedagogies, appropriate professional competency, and assessment.

In general, the problems of students not being engaged stem from two basic sources.

On the one hand, the world is becoming more complex. The working world of the future is becoming more unpredictable, uncertain, complex, and ambiguous. Because of growing advanced technologies, future employment skills will be substantially different from those of the past. While colleges are cited in reports as failing to meet student needs, the result is a catastrophe for institutions. Students are looking for career-related skills and competencies in other places. It is critical to address the issue through innovative curriculum design in order to make higher education relevant and meaningful to students.

On the other hand, increasing amounts of brain research are uncovering how humans learn. It is critical to develop creative teaching pedagogies that correspond with how the brain works in order to encourage and interest students in learning. Furthermore, more and more research shows that students who use a deep approach to learning do so as a choice rather than as a type of particular individual. This approach to learning chosen by students is dependent on the learner and the teaching context. In particular, the approach to learning chosen by students is influenced by an appropriate teaching style and a relevant assessment technique. It is critical to explore and better understand the learning process, as well as to offer a good match of creative teaching pedagogies and assessment methodologies.

The employment of modern and intelligent technologies facilitates and improves learning. More research and analysis into the integration of creative, intelligent, and learning-related technology in teaching and learning will yield insightful ideas on curriculum design, course delivery, instructional pedagogies, and competence-based assessment.

The call for papers was issued in January 2023. The call has the theme "*Engaged Learning and Innovative Teaching in Higher Education.*" We got 30 papers from Mainland China, Australia, Finland, Germany, Hong Kong, Morocco, New Zealand, Singapore, the UK, and other countries. After a double-blind assessment, 17 papers were selected for inclusion in this edited volume. They were classified into three major parts: Part I: *Innovative and Digital Learning Environments*; Part II: *Assessment and Development of Future Professional Competencies*; and Part III: *Innovative Curriculum Design and Teaching Pedagogies.*

We appreciate the work of all authors, both those who were selected and those who weren't. We value the time and energy they invested in the entries. This helps make the edited volume successful.

We would like to thank the International Programme Committee for their time and work in reviewing the papers. This critical stage contributes to the work's quality and the volume's major theme.

The COVID-19 outbreak is progressively dissipating. The majority of learning is returned to campus and is done face-to-face. Everything appears to be back to normal. However, the issues persist. It will take our ongoing efforts to discover relevant and meaningful higher education for students, and students will recognise the value of it. This initiative, we believe, will provide a venue for international academics and practitioners to exchange their knowledge, discoveries, and ideas for a better future.

Hong Kong, China   Will W. K. Ma
November 2023

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About the Editor

Prof. Will W. K. Ma, Ph.D. holds the position of Professor and serves as the Director of the Centre for Innovative Teaching and Learning (CITL) at Tung Wah College in Hong Kong. At the University of Hong Kong, he earned a Ph.D. in educational technology. At the Hong Kong University of Science and Technology, he earned his M.Sc. and M.Phil. in Information Systems Management. Dr. Ma's study is concerned with the application of information systems to communication, knowledge sharing, and knowledge creation. He has publications in *Computers and Education, Computers in Human Behaviour, Journal of Computer Assisted Learning, International Journal of Communications, Law and Policy, Information and Management* and so on. He has co-edited over ten books in the fields of education, communication, and technology. He is the co-editor of the *Journal of Communication and Education* (2015–present), and he was the editor of *Cogent Social Sciences*, Taylor & Francis Online (2017–2019). Since 2018, he has served as the Editor of the *Educational Communications and Technology Yearbook* series (ECTY) published by Springer.

Chapter 1
Engaged Learning and Innovative Teaching

Will W. K. Ma

> Most students in most undergraduate courses become increasingly surface and decreasingly deep in their orientation to learning. (Biggs et al., 2001, p. 138).

The basic goal of higher education educators is to encourage student participation and engagement in learning, particularly by encouraging students to use a deep learning approach to learning. It is worthwhile to make an ongoing effort to investigate innovative approaches to teaching in order to enhance and engage learning.

Broadly speaking, the problem of students not being engaged emerges from two major factors:

- Firstly, society becomes complicated and technological advancement rapidly changes the nature of jobs and future job skills and competence. Higher education does not change fast enough to cope with the career development and needs of the students. The general needs of the students have not been met. Higher education seems irrelevant to them. Students are not engaged in learning. They even doubt the value of higher education.
- Second, teaching methods and assessment strategies are not used appropriately. It encourages the use of a surface approach, a lower cognitive level activity. In other words, students are not engaged in their learning.

1.1 The Innovative Curriculum—Educating for Knowledge, Educating for Skills

Reports and media quotes described that:

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- *"Colleges are failing to meet the demands of students and the outcome is a crisis for universities. Students are looking for career-aligned diplomas elsewhere"*
- *Utah* "*continues in the steps of other governments and private firms that have shifted away from requiring a four-year degree to fill 98% of state executive branch posts"*
- *"More than 70% of employers claim that a college education is no longer a trustworthy indicator of an employer's quality"*
- *"The feedback mechanism that is the characteristic of the majority of jobs today is not present in the college classroom, which reinforces the message that failure is unacceptable and the majority of students have never experienced it"*

In response to the challenges, a new paradigm of educating for knowledge and educating for skills has arisen in higher education. The idea that firms prepare workers for employment while colleges provide general education for life seems needed to be changed if higher education is to remain relevant to students. There have been suggestions that colleges should offer both a broad education and the specialised skills required for the industry. One of the issues with higher education today is that even when the most beneficial learning opportunities are increasingly occurring outside of the classroom or away from campus, students are still paying ever-rising tuition prices for the academic experience on campus. To meet students' expectations for return on investment, higher education needs to re-think how to tackle the challenges.

Innovative curriculum is evolved and experimenting, outbreak the traditional curriculum framework. Some common keys are to provide higher education with lifelong education, flexibility, future job skills/competences, real-life and authentic learning opportunities, and so on.

Examples of innovative curriculum design:

- *For instance, the 60-Year Curriculum, which is centred on lifelong learning about occupational changes and transition and was proposed by Christopher Dedi and his colleagues, aims to build young people's capacity for constant reinvention to deal with an uncertain and changing workplace and to take on occupations that do not yet exist in response to longer life, longer working careers, and more education at older ages.*
- *As another illustration, Arizona State University has experimented with a degree programme where students learn the material for their majors through a series of projects rather than a set schedule of classes or a traditional degree programme based on courses. This allows students to apply a theory while they are learning about it.*
- *Additionally, a new degree programme at Georgetown combines academic and employment goals. Within the same time frame of four years, it combines a bachelor's degree in the liberal arts with a master's degree in a particular field. Professors define the skills that students must acquire in order to achieve combined undergraduate and graduate degrees, moving away from the course as the only means of evaluating learning.*
- *Central Queensland University incorporates micro-credentials in nearly all study areas. Micro-credentials are designed alongside industry to prepare learners with*

opportunities to update and advance their professional and industry knowledge and skills, to enhance their employability, or towards the development of a professional. At completion, each micro-credential is awarded a digital badge as a high-tech verifiable record of the knowledge and skills earned. The badges can be organised into a portfolio, shared online, or downloaded, for presenting to prospective employers. A Certificate of Completion is also available for download.

- *Nearly half of the University of Waterloo's 35,000 students alternate four-month periods on campus and in the workforce as part of the largest co-op programme in the world. Learning outside of the classroom and even after college graduation is encouraged through programmes including post-college bridging programmes, co-ops, apprenticeships, and internships. Many new start-ups, such as Koru, Minerva University, boot camps, Venture for America, and others, have popped up to complement, if not compete with, college education and fill the gaps left by colleges.*

1.2 Engaged Learning—Deep Knowledge Learning, Deep Approach to Learning

The generic aim of good teaching is precisely to encourage students to adopt a deep approach and to discourage the use of a surface approach, "Deep approaches to learning are those most consistent with the aims of university teachers" (Biggs, 1989, p. 14).

According to Sawyer (2022), by the 1980s, cognitive scientists found that "*learners retain material better and are able to generalize it to a broader range of contexts, when they learn deep knowledge rather than surface knowledge and when they learn how to use that knowledge in real-world social and practical settings,*" (p. 4). Deep knowledge learning is differentiated from traditional classroom practice, including (p. 5):

- *Deep learning requires that learners relate new ideas and concepts to previous knowledge and experience.*
- *Deep learning requires that learners integrate their knowledge into interrelated conceptual systems.*
- *Deep learning requires that learners look for patterns and underlying principles.*
- *Deep learning requires that learners evaluate new ideas, and relate them to conclusions.*
- *Deep learning requires that learners understand the process of dialogue through which knowledge is created and they examine the logic of an argument critically.*
- *Deep learning requires that learners reflect on their own understanding and their own process of learning.*

Similarly, Sawyer ractice what learning scientists have come to a consensus about learning by the 1990s, including (2005, p. 3–4):

- *The importance of deeper conceptual understanding.*
- *Connected learning.*
- *Focusing on learning in addition to teaching.*
- *Designing learning environments.*
- *The importance of groups and contexts.*

In the book Teaching with the Brain in Mind, Jensen (2005) analyse the concept of motivation and engagement with respect to the findings of brain research, including common sources of *demotivation* (e.g., lack of positive relationships between the teacher and the students, or among the students); positive functions of *rewards* (e.g., increased the frequency of goal-seeking behaviours); *intrinsic motivation* (e.g., activate a student's natural curiosity to learn); *states* (e.g., sensation, feelings, and thoughts combined) and *states management* (e.g., eliminate threats, set daily goals that incorporate some student choice); and the ways to motivate and engage students. It is suggested that:

- Ask "*In what way is the brain naturally motivated from within?*", instead of asking "*How can I motivate students?*" (Jensen, p. 111).

For example, to include all the elements for the brain naturally works in learning, Jensen illustrated an exemplar for engaging learning, "*Start with meaningful, developmentally appropriate curriculum, and add learner choice and positive social grouping. Create the challenge, build a supportive environment with compelling biases.*"

For the same line of thought, the way to engage students to learn is through our better understanding of the learning process, "How humans learn?". Johnson (2019, p. 4) ractice five general principles about learning and humans:

- Learning is something humans do from the moment of birth to their last days.
- Humans are naturally inclined to learn.
- Human learning is effortless if the material to be learned is interesting or relevant.
- Human learning is effortless if instruction is aligned with how humans learn.
- Human learning is cyclical not linear.

All of the above do not suggest categorizing students as deep or surface learners (Biggs et al., 2001). Instead, deep learning is a contingency on various factors. The Presage-Process–Product (3P) model of teaching and learning (Biggs et al., 2001) suggested that student factors, teaching context, on-task approaches to learning, and the learning outcomes mutually interact, forming a dynamic system (p. 136). Prior knowledge, aptitude, and preferred learning methodologies are student factors, and the teaching context comprises learning objectives, assessment strategies, climate/ethos, teaching strategies, and institutional procedures. The student's continuous approaches to learning will be significantly impacted by the teaching context (e.g., appropriate teaching assessment combined). Two scenarios were mentioned earlier to illustrate (Biggs et al., 2001, p. 137):

- "*When a portfolio is being evaluated, a student who often picks likely assessment items and memorises them by heart ractice that this strategy won't work and instead delves deep.*" And
- "*Another student who often uses a deep approach may elect to go surface in a module with too much content and multiple-choice questions for grading.*"

To conclude, "*In an ideal system, all students would be expected to engage the highest level learning activities…*" and "*This is in fact the generic definition of a deep approach*" (Biggs et al., 2001, p. 138).

Innovative approaches to teaching are proposed, experimented, and integrated into ractice. Some common keys are to provide a rich learning experience with intrinsic motivation, connected learning, communication and collaboration, real-world problem-solving opportunities, and so on.

Examples of innovative teaching pedagogies that engage learning (This is just to name a few):

- *Interdisciplinary/intra-disciplinary/transdisciplinary/Interprofessional education: The key, according to social cognitive theory, is for educators to create opportunities for students from diverse backgrounds to learn together and to listen to the perspectives of their peers as they do so, whether those students are enrolled in the same programme or in completely different programmes at different schools. To be more specific, "interprofessional education" describes situations in which students from two or more health and social care professions study together for all or part of their professional training with the goal of developing collaborative ractice in order to provide health care that is centred on the needs of the client or patient.*
- *Learning through games incorporates the strategy, rules, and social experience of playing a game in the classroom, leveraging students' natural curiosity and desire to learn through play. Using the game-based learning model, educators may focus on specific exercises that will strengthen students' ability to put theoretical knowledge into ractice. More chances to learn in context and with others can arise as a result. Maintaining a player's flow experience, where they are so engaged in the activity that they lose track of time and care about nothing else, requires a delicate balancing act between the game's inherent challenge and the player's ability to address and overcome it.*
- *Based on the notion of experiential learning, project-based learning encourages students to learn* via *participation in authentic and personally relevant projects. Each student group decides on its own what problem they want to solve and how to go about doing it. Students learn more and retain it longer when they actively investigate and deal with authentic issues.*
- *Inquiry-based learning is a type of learning that engages students by allowing them to make real-world connections through investigation and high-level questioning. It encourages students to engage in the process of problem-solving and experiential learning.*

1.3   Theory and Practice: Engaged Learning and Innovative Teaching

In order to adapt to the changes and the demands to make higher education more relevant to students' lives, therefore more engaging, innovative ideas, models, and frameworks are developing, experimenting with, and evaluating.

This chapter and the overall theme of the book call for a research agenda on engaged learning and innovative teaching:

- The research agenda calls for research at all levels, including the institution, the curriculum/programme, and the classroom; and with all stakeholders, including professional and industry collaborators, teachers, and students.
- The research agenda calls for ongoing study on successful and innovative teaching strategies that engage students.
- The research agenda calls for looking into the conditions that allow good teaching pedagogies, like contingency mapping with assessment strategies, to function in the real world.
- Additionally, more study is needed to examine the difficulties and barriers that teachers encounter in practice.
- In particular, the research agenda calls for research into cutting-edge learning-associated technology with evidence.

With our continual efforts, we are demonstrating our improved grasp of engaging learning through innovative teaching.

1.4   Outline of the Book

In addition to this introductory chapter 1, this volume is comprised of 16 articles categorised under three primary topics: (1) Innovative and digital learning environments; (2) Assessment and development of future professional competencies; and (3) Innovative curriculum design and teaching pedagogies.

1.5   Theme: Innovative and Digital Learning Environments

The purpose of Chap. 2, "Educators' Experiences in Enabling Students Learning for the VUCA World," is to examine educators' experiences in building and implementing learning environments in higher education institutes that prepare students for future working life in the VUCA (*Volatile, Uncertain, Complex, and Ambiguous*) world. The study found disparities in instructors' experiences and perceived value of design features.

The purpose of Chap. 3, "An Examination and Analysis of the Integration of Artificial Intelligence and Gamification in the Pedagogy of Chinese Higher Education," is to investigate the synergistic relationship between AI and gamification in the context of Chinese higher education. The study explored the possible benefits, limitations, and ethical concerns involved with these technologies, paving the way for further research.

The purpose of Chap. 4, "Peer Learning to Promote Active Learning in Online/ Hybrid Classes—A Case Study for Science Education," is to examine the effectiveness of online learning platforms, including the provision to promote peer learning among students through the use of specified activities. Students generally agreed that online learning and peer learning may help them reach their learning objectives. Approximately two-thirds of students were satisfied with their online learning and peer learning experiences.

The Chap. 5 is called "Big Data Integration in Digital Marketing Education: A Focus Group Study." It intends to include big data concepts in marketing education. The course portal, which includes both content and exercises, serves as a model for portal design. Focus group interviews were used to assess students' learning experiences, and the comments showed the need for customised tutorials, workshops, and introductory courses to address student concerns and improve understanding of complicated ideas.

The purpose of Chap. 6, "The Impacts of E-Learning and Virtual Reality on Diagnostic Radiography Education," is to review the effects of electronic learning (e-learning) and virtual reality (VR) on learners' learning experiences in radiography education. It was concluded that the good effects of both e-learning and VR outweighed the negative effects. It was proposed that blended learning be employed together with these technologies.

1.6 Theme: Assessment and Development of Future Professional Competencies

"Vocational education input for a sustainable hospitality industry," Chap. 7, aims to investigate the vocational education input aspects that lead to a sustainable industry workforce. It was discovered that students' affect towards the field were the most powerful predictors of vocational resilience and lifelong career choice, which are likely the most important contributors to the industry's sustainability. It is suggested that higher education providers, in addition to the usual inputs of skills and knowledge, place a greater emphasis on fostering students' affective self-concept in their vocational education programmes.

The Chap. 8, titled "Closing Competency Gaps for Engineering Students Using a Competence-Based Assessment Format," aims to assess learners' skill proficiency and narrow employers' and young engineers' perspectives on the competency requirements in the construction industry in the world of digitalization using

Workplace Learning and Assessment (WLA). The study demonstrated a discrepancy between employer expectations and students' knowledge and competency level by examining current practises on the apprenticeship method, with offered improvements.

The title of Chap. 9 is "Empowering the Future of Construction and Quantity Surveying Professionals: Unveiling the Skills Revolution in New Zealand's Construction Industry." The study's goal is to determine the necessary competencies for the future and investigate how the academic curriculum might be changed to meet changing corporate requirements over a three to five-year period. According to the study, key topics for designing construction and quantity surveying programmes include data analytics and STEM knowledge, cooperation and communication, energy management, and the circular economy.

Chap. 10 is titled "Modelling of Domain-Specific Competence Among Technicians (EQF 6) at Higher Education Facilities in Germany and Integration Thereof in Ackerman9s PPIK Theory as a Possible Framework." The research investigates the organisation of domain-specific competence among technicians (EQF 6) at German vocational schools. Content knowledge and analytical problem-solving abilities were discovered to be multidimensional. Multidimensional content knowledge has the largest regressions in terms of analytical problem-solving competence.

The Chap. 11 is named "Re-validating an Assessment Tool to identify, Assess, and Develop Higher Education Students' Innovation Competence in Online Education." It seeks to investigate a re-validated tool for identifying, assessing, and developing innovation competencies in online learning environments. The final re-validated assessment tool includes five dimensions of innovation competencies: creativity, critical thinking, initiative, teamwork, and networking, with 33 items describing innovative behaviour and action, as well as a new subdimension with four optional items describing sustainable development as part of critical thinking.

1.7 Theme: Innovative Curriculum Design and Teaching Pedagogies

"Work-Life-Study Balance Challenges and the Overcoming Strategies of Women in the New Zealand Construction Industry," Chap. 12, intends to investigate strategies that could be used to help integrate family, career, and study into a sustainable framework. Workplace flexibility, family assistance, particular laws/policies, remote work choices, inclusive education, and industry partnerships were discovered to be necessary for women in the New Zealand construction industry to attain a work-life-study balance.

The purpose of Chap. 13, "A Philosophical Approach to Teacher Education," is to investigate the influence of a Philosophy for Children (P4C) programme on Hong Kong teachers, with a particular emphasis on its effectiveness in encouraging dialogic

and inquiry-based teaching techniques. According to the findings, the training considerably improved teachers' ability to engage in dialogic and inquiry-based teaching, hence increasing their overall efficacy in the classroom.

Chapter 14 is titled "The Structure of Vocational Interests of Future Technicians (EQF 6) in Mechanical Engineering for Interpreting Technical Drawings." The study's goal is to investigate the pattern of occupational interests in the technician profession (European Qualifications Framework 6). It has been discovered that occupational interests can be expressed as a quasi-circumplex.

The title of Chap. 15 is "Technology-Aided Learning at the Intersection of Presence-At-Hand and Readiness-To-Hand, and the Fusion of Horizons Among Students, Technology, and Teachers." The study intends to conduct a philosophical examination of the phenomenon of technology-aided learning among students and teachers, based on Heidegger's and Gadamer's philosophical Hermeneutics. The analysis shows how the interaction between the two modes of employing technology objects, ready-to-hand and present-at-hand, encourages calculative reasoning about thematic knowledge issues, further driving the growth of scopes linked between students and teachers.

The purpose of Chap. 16, titled "Existential Relationship Between Teacher-Centred and Student-Centred Learning Inauthentic Solicitude as a Necessary Condition of Authentic Solicitude," is to argue for a connected relationship between the teacher-centred and student-centred learning approaches from a Heideggerian existential perspective. The study concludes that both learning approaches have their own statuses and existential implications and that neither is the superior learning approach.

Chapter 17, titled "Hollowing Out and Reinventing Higher Education: An Individualist Perspective," adopted an individualist perspective as a theoretical framework, and proposed the view of strengthening higher education through public management concepts of "hollowing out" and "reinventing".

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Part I
Innovative and Digital Learning Environments

Chapter 2
Educators' Experiences in Enabling Students Learning for the VUCA World

Sirpa Hänti and Koen Veermans

Abstract Working life has seen accelerated change during the past decades. This change has been described as volatile, uncertain, complex, and ambiguous (VUCA). The critical role of Higher Education Institutions in preparing the students for working life has also gained some recognition, but studies on educators in HEIs are still very rare. The aim of this study is to investigate educators' experiences in designing learning environments that aim to prepare students for the future working life in HEIs across 13 different learning environments in 5 countries. This article brings new insight on how the educators experience enabling student's learning. Three educator profiles could be derived, and the study shows differences among educators in both experiences and perceived importance of design elements. However, more research is needed on how educators perceive these learning environments, and how these may or may not support their role in enabling students' learning for the VUCA world.

Keywords Learning environment · Design elements · VUCA · Higher education

2.1 Introduction

The Covid-19 pandemic, the geopolitical challenges, and AI have expanded the scale of change in the society and in working life during the last few years. However, even before these, the working life has seen accelerated change during the past two decades, based on global megatrends, such as digitization and globalization (Kiiski Kataja, 2016). This change has been described as environments becoming more volatile, uncertain, complex, and ambiguous (VUCA) (Bennet & Lemoine, 2014;

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Horney et al., 2010). The background of the acronym VUCA is rooted in the U.S. Army War College's recognition of the need to characterize the requirements for the future operation of their students (Baran & Woznyj, 2020). Although VUCA was presented originally in educational context, subsequent use of VUCA in research has concentrated mainly on management and leadership in the context of organizations (Johansen & Euchner, 2013; Lawrence, 2013). While this line of research is important, this shift from the educational context to the organizational context also shifted away attention from the critical role and the potential of Higher Education Institutions (HEI) in preparing the students with the skills, competences, and abilities needed in their future working life (Konst & Scheinin, 2018).

Although the need for preparing students for the VUCA world has been acknowledged, the studies on pedagogy or designing learning environments for extending our understanding on the topic are still rare (Fadel & Groff, 2019; Seow et al., 2019). Only a few studies have focused on VUCA in educational contexts, for instance, on the required skills for the VUCA work environment (Fadel & Groff, 2019), on how a certain learning approach prepares students for the skills needed (Seow et al., 2019) and in the context of student teachers' social-emotional competencies during the Covid-19 crisis (Hadar et al., 2020).

The focus of the present study is on an important but even less studied aspect of preparing students for VUCA in their work-life future: educators in HEI. This is important because these educators are responsible for the design and implementation of learning environments and as such an important determinant for student outcomes. Given the novelty of the topic, it is to be expected that the educators' perceptions on design and implementation will not be uniform, and understanding patterns in the educators' perceptions may help both the design of learning environments and preparing educators for the implementation. Thus, it is interesting to investigate on the one hand, what is important in designing learning environments that apply innovation pedagogy and on the other hand, if there are profiles of educators who are working in these learning environments that differ with respect to their experiences with these learning environments and their perceptions on what they view as the important aspects of these learning environments.

Therefore, the aim of this study is to investigate educators' experiences in designing and implementing learning environments in HEIs that aim to prepare students for the future working life in the VUCA world.

This study pursues to answer the following research questions:

1. What profiles can be identified among the educators, based on their experiences working in these learning environments?
2. What is perceived as important in designing a learning environment that aims to prepare students for the VUCA world?
3. How do perceptions of importance in designing a learning environment vary across educator profiles?

This will be done by looking at the perceptions and experiences of educators working in different learning environments that aim to prepare students for the VUCA

world. The design of these learning environments draws on ideas from innovation pedagogy and views educators as key actors for the integration of elements of working life in a VUCA world in learning environments.

2.2 Theoretical Background

2.2.1 Innovation Pedagogy

Badcock et al. (2010) have presented that HEIs cannot fulfil the demands of developing the skills needed for the rapidly changing job market alone. Thus, there is a need to extend the traditional modes and methods applied in today's learning environments towards collaboration (Avvisati et al., 2013; Vila et al., 2012) with students from different disciplines and stakeholders from working life (Keinänen & Kairisto-Mertanen, 2019; Pérez-Peñalver et al., 2018). It has been suggested that authentic real-life problems should be included in the learning process as it is more recommendable to learn to problematize and set questions than to teach facts and principles to enhance the competences required to innovate (Kivunja, 2014; Nykänen & Tynjälä, 2012). New methods for developing the competences of students and teachers should be applied for questioning the existing beliefs and behaviour in the higher education field but is also developing, renewing, and questioning the models of operation in working life (Assink, 2006 as cited in Keinänen & Kairisto-Mertanen, 2019; Keinänen, 2019). Based on this, different pedagogical strategies and practices that emphasize working life skills, self-management issues, pedagogical collaboration in teaching and learning as well as combining knowledge from theoretical and practical sources are needed (Nykänen & Tynjälä, 2012).

Innovation pedagogy is characterized as a strategic approach to learning that "defines in a new way how knowledge is assimilated, produced and used in a manner that can create innovations" (Kettunen et al., 2013, 336). The main idea of innovation pedagogy is "to bridge the gap between the educational context and working life" (Penttilä, 2016, 261–262). This is enabled by extending individual learning to collaborative learning through group-based, and networked learning between the higher education institution and its environment (Kettunen et al., 2013). In networked learning, the multidisciplinary character is fruitful since the diversity of expertise is needed in promoting innovations in working life (Kettunen et al., 2013). The aim of innovation pedagogy is to keep students engaged in their learning through actively constructing knowledge and meaning in the situations they face. In addition, the active role of students extends not only to taking responsibility for reaching their learning goals but also to being owners and directors of their own learning (Keinänen, 2019; van Ewijk et al., 2020). To be able to let the students be more active in their learning and accepting the difficulty in forecasting the skills and knowledge needed in the changing working life, the teaching profession is renewing

towards enabling, coaching, supporting, or encouraging (Konst & Scheinin, 2018; Keinänen & Kairisto-Mertanen, 2019.)

2.2.2 Learning Environments

Learning environments have been approached from several angles which may consist of, e.g., interconnected, and synergetic dimensions of physical space, ICT, and pedagogy (Valtonen et al., 2021). Further, a learning environment can be understood from physical and virtual views (Valtonen et al., 2021) as well as from social and cultural views where a network of multiple actors forms a collaborative learning process (Caravalho & Goodyear, 2018). In addition, a contextual view of a learning environment refers to connecting learners to their environment through authentic real-life situations where the individual (subjective) and socio-cultural (inter-subjective) spheres are in simultaneous interaction to create knowledge (Vanderstraeten & Biesta, 2019). However, it has been stated that learning cannot be designed but situations with activities that lead to learning can be indirectly designed. The role of a person´s own activity in learning is crucial and as examples of these activities, thinking, making, arguing, writing, and reflecting have been mentioned (Caravalho & Goodyear, 2018). Thus, there is a need for developing such learning environments that are fostering the application of student-centred teaching and learning practices as well as pedagogical approaches that highlight the active role of students (Valtonen et al., 2021). In this study, the definition of a learning environment is adopted from Bouw, Zitter and de Bruijn (2019, 2021) who base their view on earlier suggestions of Goodyear (2005) describing the meaning as "to indicate educational arrangements or systems that are designed and managed" (Bouw et al., 2019, 2021). Further, Bouw et al. (2019, 2021) refer to Caravalho and Goodyear (2018) and Zitter and Hoeve (2012) by emphasizing the role of both the socio-cultural setting as well as the physical or digital setting in which learners perform their tasks.

2.2.3 Educators as Integrators of a Learning Environment and Working Life in VUCA World

The need to redesign the curriculum for preparing students for the VUCA world has been acknowledged but the studies on pedagogy or designing learning environments for extending our understanding on the topic are still rare (Fadel & Groff, 2019; Seow et al., 2019). Seow et al. (2019) studied experiential learning pedagogy in the context of a Singapore university that introduced the so-called UNIS-X approach that encompasses four principles (project-based learning; interdisciplinarity; close collaboration between faculty and external partners; and active mentoring) applied in a single course. The focus of this study was mainly on students' learning outcomes

and thus, not perceptions or experiences of educators working in those learning environments. Learning outcomes are of course important as they are ultimately the aim of the learning environments, and contemporary studies in applied contexts (e.g. University of Applied Sciences) have been described as demanding more activity, responsibility, planning, and setting goals within the studies from the student's side than more traditional studies. The role of the teacher in these contexts is designing and planning the learning process in working life based projects or courses as well as how instruction on and around the learning process will be organized in ways that it bridge between the educational institution and future work (Koli, 2003). There are multiple options to integrate learning environments that facilitate contextual experiences for students, already during their studies (Bouw et al., 2021). Bouw et al. (2019) list examples like work-related projects, different simulations, and student-run businesses e.g., consultancy firms. Although, there are several ways of integrating the context of the field into the studies, there is no agreed upon definition that states what these designs should look like.

The literature on working in VUCA environment in relation to leadership and organizations, provides helpful insights in this respect. In these contexts, working in VUCA environments has been described as challenging, confusing, and uncertain but also with more positive views, like rewarding, meaningful, or motivating (Johansen & Euchner, 2013; Lawrence, 2013). In addition, working in VUCA world, makes it clear that existing knowledge is insufficient and thus it may cause a crisis in learning (Antonacopoulou & Sheaffer, 2014). Bollinger, van Rooijen, and Munneke (2017) have suggested that in a learning environment where the approach is based on researching, uncertainty is natural, and even needed for finding solutions. However, the research process itself is not always making the process comfortable for the individual. They suggest that uncertainty in the learning process may be productive if it is possible to create learning environments where safety and uncertainty are present at the same time (Bollinger et al., 2017). This requires educators to design such learning environments where students may encounter such future working life experiences in a safe environment during their studies.

In this study, the framework for designable elements of integrative learning environments by Bouw et al. (2021) is applied as a lens to look at the design of such environments. The background of the framework relies on the model of Activity Centred Analysis and Design (ACAD) (Caravalho & Goodyear, 2018) and the studies of Zitter and Hoeve (2012). Bouw et al. (2021) have applied and developed this ACAD model further in the context of integrative learning environments which resulted in a descriptive framework of designable elements of learning environments as depicted in Fig. 2.1. They propose four designable elements for designing learning environments at the boundary of the university and working life: Epistemic elements (E), Spatial and Instrumental elements (SI), Social elements (S), and Temporal elements (T) (Bouw et al., 2021). These will be referred to in short with ESIST in the remainder of the manuscript.

Within this framework, Epistemic elements refer to knowledge in the focal domain and how this knowing is structured within the curriculum and present in the learning environment. In addition, the characteristics, and arrangements of tasks to be able to