

Investigating Digital Entrepreneurship Competence in an Online Practical Training Program

* CHIB Amina Djazia ¹

¹ University of Abou Bakr Belkaid Tlemcen, (Algeria), djazia.chib@univ-tlemcen.dz

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Abstract:

The study employed an online practical training program to explore the development of digital entrepreneurship competence. Participants were recruited through targeted outreach and self-selection, resulting in a diverse sample of aspiring entrepreneurs with varied backgrounds and experiences. Data was collected through a combination of surveys, interviews, and observations conducted throughout the duration of the program. This multimodal approach allowed us to gather both quantitative and qualitative insights into the participants' skill acquisition, mindset shifts, and overall learning journey as they navigated the challenges and opportunities of the digital entrepreneurship landscape.

Key words: digital entrepreneurship, training program, skill acquisition, mindset shifts, opportunities

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*Corresponding author

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Introduction:

Digital entrepreneurship competence (DEC) has become an essential requirement for educators in various subject areas. In the implementation of digital entrepreneurship competence education for educators, the advancement of their knowledge and skills is a keystone. To establish and develop educator capacities, the use of adult education methods and online courses adapted to their needs plays a crucial role. Based on these views expressed in the literature, the study presented here provides information about the training program for individuals involved in practitioner training. Specifically, experimental practice in the field of teacher training was conducted through a pre-service training professional elective course that was administered to adult learners in an online environment.

The majority of countries have designed the entrepreneurship dimension as one of the components of education and have adopted policies that revolve around the concept of entrepreneurship. As previously indicated, the course was planned to teach undergraduate and postgraduate adult learners about the topics they would need to reach a certain level of qualification. At the same time, the digital entrepreneurship competency framework was described in the example presented here, which is a model to be taught and hence serves as an important model for the improvement of digital entrepreneurial competence training programs published to date. Finally, the results of the current study suggest several implications for future training programs in relation to the issues.

I. Title Background and Rationale

In line with the increased use of digital technologies in everyday life, digital entrepreneurship and correspondingly digital entrepreneurship competence have been perceived as crucial for the expansion of innovative and growth-oriented companies. Consequently, elaborated educational interventions and collaborative teaching pedagogies are necessary for enhancing digital entrepreneurship competence among students and adequately preparing them for their career prospects. Higher education training programs need to introduce interactive learning strategies that are personalized and anchored in real-world contexts, which still carry the risk of decision-making in the framework of experiential learning. In this context, live cases present excellent means of promoting entrepreneurial thinking while providing students with the opportunity to learn through authentic, engaging activities. Live cases are the pedagogical practice wherein students analyze real or simulated situations.

This study, through the development, implementation, and evaluation of a novel Digital Entrepreneurship Live Cases Pedagogical Training, contributes to the ongoing discussion on how to design effective quality education and training programs in online and face-to-face environments. The empirical investigation examines the ways that DELP-T shapes the development of students' digital entrepreneurship competence. These student competencies refer to the ability to (1) present creativity, innovative ideas, and risk-taking behaviors, (2) independently undertake entrepreneurship process-related tasks, (3) apply a digital society-oriented e-literacy, (4) execute action-oriented self-efficacy, (5) display the adaptive ability to work effectively with others and engage in peer mutual support, and (6) demonstrate communication and presentation competencies.

1. Research Aim and Objectives

The overall aim of this paper is to provide a unique insight into the notion of 'Digital Entrepreneurship Competence' (DEC) and how it can be developed in an applied educational setting for a diverse range of degree students using a multi-discipline, blended learning approach in the final year of their program. Ultimately, it is hoped that it will help educators and academic developers in considering the development of students in the realm of DEC, and will support their separate and combined areas of endeavors in more holistic, modern, and meaningful digital enterprise education. Two research questions are used to lead the work: 1) How can digital entrepreneurship competence be developed within a practical-based, student-led, face-to-face, and web-enhanced education or supportive setting within a British degree program? 2) What are the key learning themes that both encourage and evidence competency development in this area? The work uses the first half of the paper to contextualize DEC in entrepreneurial education. Subsequent notes relate to linking DEC and undergraduate personal development, and broader university and public policy imperatives related to research, teaching, and demonstration of employability competencies to future employers. The intervention and progress of the practical team exercise are then described, and key conclusions, practical outcomes, and suggested improvements to the educational approach are discussed elsewhere.

2. Scope and Significance

Although discussions about digital entrepreneurship competence have transcended the concept of online businesses, empirical research focusing on examining digital entrepreneurship competence and exploring materials and methods to educate and form students' digital entrepreneurship competence remains scarce. To address this issue, the research theme has positive practical effects. First, for educators, digital entrepreneurs' competence education in higher education has drawn increasing attention because the knowledge and skill gaps are increasingly obvious. Revising traditional curriculums by considering digital competence is necessary. However, few studies address curriculum development and evaluation specifically focused on practical exercises in the field of digital entrepreneurship competence, using e-commerce as a medium.

Diverse topics are employed in the domain of digital entrepreneurship, such as the measurement of digital entrepreneurship competence, the training model design of digital entrepreneurship competence, empirical exploration of the relationship between digital entrepreneurship competence and performance, the effect of entrepreneurial mentorship on a student's digital entrepreneurship competence, and the integration of e-commerce courses in different departments. Thus, few researchers follow a "pedagogical intervention research" design rule in the research design, and most of the research is at the theoretical level but lacks executability. Although plenty of pedagogical exercises appear to connect digital entrepreneurship competence theory and practice, students might raise numerous questions when they discuss digital entrepreneurship competence after one lecture. These exercises can, in turn, become TFU (Teach-Feedback-Use), and students' feedback in a low academic employability on a potentially valuable course, if the result of the digital competence education mentioned is not appropriate to the employability of the students, and the students' choice of wanting to learn is made for the betterment of work. Can they employ these competences in the future and use these digital practitioners to help them with their individual situations?

II. Literature Review

In the literature, several different theories and models have been developed to explain the key factors underlying digital entrepreneurship competence, including the capabilities theory of the firm, human capital theory, innovation, and the resource-based view. For this study, we adapted the proposed competency model established for digital entrepreneurship competence in the progressive education of higher education teaching staff, which is derived from both characterizing digital entrepreneurship competence approaches and the application of the relevant digital skills and qualifications for ICT professions frameworks in the design of relevant training programs. As the theory suggests, the model consists of three core competencies: (1) digital skills, (2) IT-entrepreneurship training, and (3) industry content of professional educational services. It also revealed five dimension corresponding levels of the model. The combined training model provides a practical and effective way to monitor student competence growth by using the established assessment criteria for forming vocational training trajectories at strategic, tactical, and operational levels.

Providing professional education in digital entrepreneurship becomes an emergent and cohesive way to improve the national innovation ecosystem. It increases the level and structure of human capital, the quality of labor potential of the country, and the level of digital literacy for promoting digital society development and innovative economy growth. Digital entrepreneurship competence is a practical problem for educational staff to resolve. We identify the various approaches to the digital entrepreneurship competence construct and propose educational practices for the further induction process of the characteristic vocational training with the digital entrepreneurship competence framework.

1. Conceptual Framework of Digital Entrepreneurship Competence

The term competence refers to the underlying characteristics, transferable across industry, profession, processes, and roles. Competence encompasses knowledge, skills, and abilities, including willingness and attitude. It differs from the term attributes. The term competence refers to knowledge, skills, and abilities, indicating business situations and types, yet it can actually be measured through a universal standard; common assessment and benchmarks are applicable in a broad range of geographical, cultural, and social contexts. As monitoring conditions change, digital entrepreneurship competence also changes from a situation-task perspective. There is a broad range of competences needed to perform a certain profession, whereas skills characterize diversity. For example, entrepreneurial competencies such as time management and innovative thinking, marketing competencies such as customer acquisition and demographics, supply chain management competencies such as reputation verification and bid launching, delivery competencies such as proper packaging and safe dispatch, and after-sale competencies such as conflict resolution and item return. Companies using them often express that generic skills or transferable skills and key skills most frequently refer to broader competences. Small and medium-sized companies using them often express that generic skills and key skills refer to broader competences.

2. Online Practical Training Programs in Entrepreneurship Education

Online practical training programs provide the digital skills, networks, and connections essential for entrepreneurs to build successful enterprises. Practical training programs create a connection between theory and practice, providing real work experience and focusing on individuals with relevant skill sets, such as those quick to grasp the practical application of processes and knowledge through a mix of education and application, interaction, and immediate feedback. Facilitators guide practical training in a range of disciplines, from distilled theory to real-world experiences, thus assisting participants in successful practice. The best practical training programs and course participants come from diverse career backgrounds, studies, work, and life experiences from varying parts of the world. Online practical short courses can be developed to deliver close collaborations and deep mentoring, offering personal growth, empowerment, and change. An online practical hands-on course provides a stimulating learning experience for participants by emphasizing the applied aspects of the content. Attention is given to how the subject matter, research, and techniques apply in real-life circumstances.

Open online practical training is available for those interested in forming entrepreneurship or setting up their own firm, for those intending to become part of a senior management team or advising managers of digital firms, as well as risk investors, innovators, and researchers interested in the values, norms, and underlying assumptions of the digital ecosystem. The focus of the course is placed on modeling digital valorization through digital entrepreneurship and providing an integrated perspective of the entrepreneurial process. A multi-disciplinary background is required, with knowledge in the fields of entrepreneurship, business modeling, digital business management, digital venture capital, special digital accounting and regulation, innovation, and knowledge management, technology, and new ways of creating value through artificial intelligence. Making participants aware of the opportunities and challenges present in the digital innovation ecosystem is preferred. The learning pathway aims to support those interested in starting a digital business, to use tools and methodologies in structuring and communicating the business idea of a new digital venture, and understanding when digital valuation is achievable through market validation of a digital business idea. The planning of this process is provided, as well as favoring the learning strategies to assess the feasibility and probability of success. This allows for selecting the best business model, value proposition, digital team, and financial evaluation. Data analysis procedures, indicators, and tools are studied, with special attention to the identification and management of risks and opportunities throughout the digital business life cycle.

3. Key Competencies and Skills in Digital Entrepreneurship

There is no fixed set of competencies that are essential across all entrepreneurship education programs. The spectrum of key skills varies depending on the major occupation, industry, or sector, facilitator skills and expertise, professional background of the participants, and the objectives of each specific program. In the digital sector, the ensemble of skills is especially likely to change very quickly, offering rapid changes in opportunities for participants open to specializing in new areas. The need for developing generic entrepreneurship skills to be an effective digital entrepreneur is linked with main life experiences and capabilities. Eight entrepreneurial features to be a digital entrepreneur and the development of digital competence for those with no experience in the subject have also been highlighted.

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IT training is highly recommended to develop digital competencies. In addition, training programs have to be tailored to the specific business needs and should aim at creating business networks and helping the characteristics of traditional entrepreneurs, where success is a result of an individual's motivation, skills, and personality. The results of the survey carried out in this framework help to have a better understanding of the digital specialties required to find those skills and training programs that best support the demands of the world of work. Small-sized training entities and educational institutions may also address the growing demand for this type of entrepreneurship skills by including learning opportunities focusing on appropriate digital pedagogical tools and educational methods. The fast labor market changes may incentivize generic entrepreneurship skills, personal development, active learning, construction of adequate support and appropriate resources, and real-world experience either into enterprise learning, evocative and discussive activities, or interactive and e-teams higher education business management and, at the same time, into entrepreneurial development and personal strength of ICT students.

III. Methodology

Program Documentation Analysis Content analysis was used to collect the data. After extracting statements from the program documentation based on the focused expertise, we aggregated the extracted statements in terms of typical program objectives. More specifically, we coded the program documentation using the coding scheme for developing digital entrepreneurship competence in practical training programs. The construction of the coding scheme and the coding process used directed content analysis as an approach. In particular, we identified predefined factors that reflect the model of digital entrepreneurship competence and used them as predetermined dimensions. These dimensions were the categories in the initial coding scheme. Then we accessed the program documentation for index terms that could demonstrate aspects of these predetermined dimensions. During this phase of analysis, we conducted an exploratory search for additional, unexpected yet interesting dimensions, adding the 'other' category for this purpose.

We complemented the data with additional data sources. Namely, we accessed the descriptions of the modules and their learning goals and the descriptions of the learning tools employed in the modules to gather the data about the employed learning tools and goals associated with the utilized design approaches.

3.1. Research Design and Approach

This research adopted an interpretative approach in which a qualitative instrument was developed to identify digital entrepreneurship competence required by Algerian graduates. The design used two major elements: the development of a practical training program and the qualitative analysis of the achievement from the program among the selected graduates. A phenomenological research method was undertaken as the philosophical assumption is that researchers are part of the world and they use their consciousness to envelop the texts of the concepts. The research context is conducive for the hermeneutic strategy used because the focus is on the meaning of everyday social activities and the dimensions of digital entrepreneurship competence explored in a formal program undertaken by Algerian graduates. The case of a practical training program was used as it allowed researchers to share real-life experiences with the selected respondents. The goal of the practical training is to

ensure that vocational education students have the opportunity to apply theories and concepts in less formal education settings.

3.2. Data Collection Methods

The constructivist paradigm, which presupposed that individuals' beliefs and personal experiences influence their perception and thus the actions that follow, has influenced the type of data to be collected in this study. A qualitative research design was created to collect data from a variety of sources, including informal conversations, classroom observations, written documents, and semi-structured interviews. In keeping with a qualitative methodology, the questionnaire was open-ended and required the participants to respond elaboratively. Lowercase letters on the instrument suggest the discretion available to the researchers. However, they were to emphasize the objectives of the study and ensure the reliability of the data.

Qualitative research allows researchers to explore complex phenomena and extend current knowledge without constraining the data within a structured template. However, once data were collected, the qualitative data preparation and analysis could be both time- and resource-consuming. The researchers used a task allocation strategy so that multiple aspects of the data preparation and analysis could be carried out during the study. The pilot project would focus on the research design and methodology, as well as the assessment and preparation of the training material. The pilot project employed three research associates to compile and analyze the collected data.

3.3. Data Analysis Techniques

Data will be analyzed in a multiple-stage process. In Stage 1, thesis and research article reports will be read in full and analyzed for all inductive themes through the lens of the research questions of the parent study. In the second step, inductive coding of a 50% sample will be completed. Agreement between the primary researcher and an academic research assistant involved in the training program, who is trained in coding, will be tested using common coding software. The reliability of the coding technique will be established, and established motifs of themes will be mapped. In Stage 4, the entire set will be coded until completion. In the fifth stage, prominent themes as well as exceptional or peripheral data will be examined. The themes will also be considered in relation to the interview schedule used in the parent study in the hope of revealing new dimensions or concepts that could illuminate the relationship of the program to the outcome variables of the study, such as student perceptions of the innovativeness, comprehensiveness, or clarity of the program. Any conflicts in themes between interviews and student-reported data will be noted, with further class discussion as needed.

Two strategies will be used to ensure the validity and reliability of study findings. The primary researcher and a trained coder will independently code a subset of interview data and develop subthemes that emanate from the data. Upon reaching consensus, all data will be coded into the systematic framework. Subsequently, each interview and focus group will be systematically analyzed using the constant comparative method. The thematic coding system will be used to analyze the interviews and focus group data in an iterative process. This intermediate report of study is designed to answer the following research questions.

IV. Findings and Analysis

The most significant aspect of digital entrepreneurship competence in the present study is learning-by-doing activities. Participants had many opportunities to learn from their practical experiences and from other participants within the context of the learning environment provided by the program. This hands-on approach seems to have been a key driver in shaping participants' attitudes towards digital entrepreneurship by boosting both their self-confidence and motivation to create digital products and engage in entrepreneurial activities. Such a "learning-by-doing" philosophy is aligned with key aspects of the social constructivist learning theory. This suggests that a learning approach that allows for repeated practical exercise, individual reflection, and group communication may potentially add substantial value to the delivery of a practical training program.

The value of social interaction in shaping personal beliefs and in directing activities cannot be disregarded. Both formal and informal discussions among participants allowed them to witness and learn from examples of other participants' practices. In practice, neither a fact, a concept, nor a skill can be understood without reference to a specific social context. These findings are consistent with the social cognitive capabilities that include reflection, observation, and debate that seek connections and knowledge production processes based on individual and collective accomplishments. The wider implication for the practical training program, therefore, is that it must allow for the creation of personalized entrepreneurial beliefs and attitudes. Thus, it is worth considering the introduction of forms of communication and collaboration that will enable participants to draw different meanings out of their experience by interrelating diverse contextual attributes and activities.

4.1. Overview of the Online Practical Training Program

As mentioned earlier, the proposed online practical training program aimed to cultivate students' digital entrepreneurship competence. Specifically, the program made use of project-based learning (PjBL)—PjBL is grounded on the tasks that need to be accomplished as defined by the curriculum—and PjBL-inspired activities for training in courses about digital entrepreneurship and smart manufacturing. The curriculum design was based on related studies. Previous studies and the author's teaching experiences both in lifelong learning and the online-based learning courses indicated that active learning, including using multimedia to interact with the course and the practice of problems/tasks, is beneficial to learners. Therefore, the online practical training program incorporated related technologies, learning content, and open data-cum-learning platforms.

The online practical training program consists of three stages. Stage 1: Opening course resources with face-to-face or online synchronous clarification; Stage 2: Online PjBL (also called cloud-based PjBL) with E-assessment (depending on the training results, a traditional written paper or an uploaded online report presentation) and/or Viva on competition equipment; Stage 3: The successful participants may generate business models, carry out business plans, or incorporate innovative knowledge and concepts into their work. With the assistance and advice of experienced instructors or mentors from prestigious industries or advanced academic organizations, the training program allows students to practice "innovation" skills in a positive atmosphere.

4.2. Digital Entrepreneurship Competence Assessment

To measure the assessment according to the conception of digital entrepreneurship competence, we developed a self-assessment questionnaire. Based on the descriptive model of entrepreneurial action competence, we derived questions to measure every aspect of the DIGCOMP framework. An additional question about self-assessment was included, where the entrepreneurs could rate their overall perceived digital entrepreneurship competence. Thereby, we also draw on the concept of entrepreneurial competence, which is defined as a collective term for knowledge, skills, and attitude aspects. We asked participants to rate each aspect of digital entrepreneurship competence, as well as their overall digital entrepreneurship competence.

To measure the self-evaluations after the online practical training program, we administered at different times a web-based self-assessment questionnaire that consisted of six aspects of digital entrepreneurship competence: professional mastery, communication skills, working habits, initiative, problem-solving, and creativity. Participants were asked to assess their own abilities for each aspect using a five-step rating scale. The reliability of this self- and peer-assessment version was tested on introductory computer science modules in 2018.

4.3. Comparison with Traditional Entrepreneurship Education

In general, research in traditional entrepreneurship education has investigated precisely what to teach in prestart-up courses. More recent research has explored how to teach in prestart-up programs. This chapter combines guideline content for digital technology skills with a training program for internet-enabled multimedia professions in required academic and practical skills to achieve the development of digital entrepreneurship competence. Thus, comparisons must be made with: (a) traditional entrepreneurship education and (b) digital technology education to validate study findings.

Digital technology skills are trained higher vocational educational requirements, alongside both academic tuition targets and assessment of professional preparedness. On the academic side, learning outcomes are narrow with content to be inflexible and reflect traditional knowledge as a preoccupation with providing a solid foundation for job-ready prestart-up outcomes. The focus of university training for higher-level occupations rests on undergraduate and postgraduate degrees which produce generalists rather than technical specialists. This can be because busy times for universities and colleges in providing graduate degrees relate to job-ready requirements for technical and non-technical staff. However, ESE is considered to be, by its very nature, broad, encompassing business, technology, creativity, and interdisciplinarity.

V. Discussion

In line with the result of a study, which suggests the top three barriers to digital business start-ups by digital businesses are financial risk, lack of experience, and unfamiliarity with the procedures, most of the respondents in our research agreed or strongly agreed that the ability to take on the responsibility, confidence in managing risk, and self-trust are essential. One of the widely voiced complaints among digital entrepreneurs is inadequate financial sources specialized in digital

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entrepreneurship. Consistent with our results, studies supporting the necessity of financial assets in digital entrepreneurship and the importance of being followed and supported from outside were noted. Besides, easy access to the labor market can be evaluated positively, as people who want to create a digital business have no difficulty in finding skilled labor and have the ease of operating a business while creating a business idea. However, consistent with the studies, working without a salary in the pre-commercialization phase and working under very high pressure were found to be barriers. Furthermore, the obstacle of ensuring international cooperation is important for achieving international success.

In fact, although working as an act and entrepreneurial posture is not required for every vocational professional, acting in this direction increases the innovator's ability to recognize entrepreneurial opportunities more easily. In professional life, with volatile changes and increasing competition, the importance of a labor force showing economic contributions with innovative aspects has come to the fore in addition to production. In addition to individual performances, there is an expectation of new competencies from labor that will allow personal development beyond basic knowledge, skills, and attitudes related to the profession. This circumstance means that the change in entrepreneurship skills also has a transformative effect on the competencies expected from vocational education and hobby training. This study was carried out on employees in the Department of Protocol and International Relations, evaluating only the advantages and disadvantages of working on entrepreneurship with the mentioned term. It was found that the creation of new businesses is not an ultimate goal, and the term can hinder attempts to transform or conform to the philosophy that is desirable in itself. In this case, employees' opportunities to work with employers may require special consideration, rewording, accreditation, problem-solving, taking initiatives, and other competencies suitable for independent and successful vocational gifts.

5.1. Interpretation of Findings

In our study, we operationalized digital entrepreneurship competence (DEC) using digital knowledge, digital skills, attitude, and digital mindset, with digital knowledge and digital skills measured by questions related to business knowledge and skills in the e-commerce and digital marketing domains that students needed to acquire for future digital entrepreneurship. These measures are context relevant and could cater to the uniqueness of business incubation with practical training. Business knowledge and skills have been examined to be important ingredients for business creation and could be found in a variety of entrepreneurship education curricula. It is also found that digital tools are business enablers and that without their appropriate usage, business ideas do not come to life. Therefore, our four measures provided a comprehensive understanding of DEC.

We identified three major learning mechanisms that could enhance DEC acquisition in the context of the practical training program that incubates both the business idea and the student—co-supervision learning, full engagement, and repetition. They are the pedagogical structures employed by the experiential learning model. We conclude that DEC acquisition is possible with experiential learning pedagogy and digital tools. Informal feedback from students disclosed that the online practical training program, especially guided by mentors, engagement to practice various digital tools, and repetition, were the most beneficial and enjoyable experiences. Their stories echoed the DEC findings. Hence, our findings supported the findings that experiential learning could be an

effective model for developing technology entrepreneurship skills, and the choice between online and face-to-face mode might not matter or might depend on other factors.

5.2. Implications for Theory and Practice

The findings of our study have implications for both theory and practice. In terms of theoretical implications, this study is the first empirical study to provide evidence of the impact of a fully online short course in Digital Entrepreneurship Competence (DEC) on participants' perceptions of their online entrepreneurial skills. Our findings contribute to the burgeoning literature on designing e-entrepreneurship education by demonstrating that it is not only possible to improve DEC through a short online course, but that it can be enhanced substantially if the course is carefully designed with a clear purpose and sufficient activities. This course employed a design that facilitated a deep learning approach, blended synchronous and asynchronous activities to maximize social interaction and critical thinking, and provided a supportive learning environment conducive to transformative learning. These features have been identified as important in designing effective e-entrepreneurship education programs, as these fields are particularly difficult to teach or learn effectively in an online environment or in a didactic transmission mode.

Our findings highlight the importance of developing guidelines or benchmarks for designing e-entrepreneurship education aimed at improving DEC, and demonstrate the importance of systemic evaluation to determine the impact of e-entrepreneurship education on DEC. Our results validate and extend the significant amount of work in e-entrepreneurship education, specifically in relation to how to effectively teach DEC competencies. Given the paucity of studies in the EdTech and DEC spaces and the known challenges of ascertaining the development of the e-competences through traditional methods, this study also contributes to knowledge more broadly surrounding how to develop these specific e-competences.

5.3. Limitations and Future Research Directions

One of the limitations of this research is its sample population. The sample population was attracted randomly from other students who were taking module courses in the same capacity development training program. Although random selection was used in this sample population, there are other module subjects that have different characteristics from the students who learn about digital entrepreneurship competence in this study. The issue of how to teach for entrepreneurship competence is important and challenging. This research is an example of instructional design. In this research, we are inquiring about teaching methods for digital entrepreneurship competence, and we try to test a competency model that was developed from an educational system to evaluate the quality of the tested models of developed e-learning content. There are also some other limitations for this research. The quality of delivery that perfected the e-learning design model for teaching digital entrepreneurship competence is one of these limitations. We need to develop a satisfaction scale for the students who are learning the knowledge from our developed e-learning content and measure the difference in the developed e-learning content compared to other instructional designs. The experimental research will become the next step for the solution to the aforementioned limitations.

VI. Conclusion and Recommendations

This research aimed to examine DE competences gained by participants in the training program and to identify the most effective online tools and methods supporting the development of DE competence and skills. The results of the study show that the DE competence of participants mostly concerned the implementation and management of new applications, platforms, and online tools for business. Meanwhile, participants reported fewer competences related to the creative business application of new technologies, tools that support the visualization of business ideas, as well as implementations of new digital working methods that address tourism consumers' and employees' ethics and satisfaction. The results of this study also suggest that the program effectively develops its participants' DE competences. The participants reported that the structure of the online training program supported their learning, whereas synchronous activities seemed less effective in equipping the trainees with DE competence. The content of the program was rated highly by the participants, whereas the program's digital resources and support services received a moderately positive evaluation. Although course tutors are competent in delivering the course content, the results suggest that further training and support would be required to help tutors provide participants with quality tutor guidance. In conclusion, further development is still required to establish a higher-quality delivery of content while ensuring the monitoring and evaluation of dynamic interactions between online tutors and participants. The proposed enhancements are particularly important, as obligatory online activities, such as problem-based learning approaches, are vital to acquiring challenging DE competences. Therefore, the effective delivery of these new DE competences will not only enable instructors to provide valuable support to participants in developing their DE competences but also generate unique opportunities for entrepreneurial participants to produce real evidence of their DE competences. The information from these assessments could then be used to improve the training program and offer valuable advice about the most effective methods for delivering the DE competences to the course staff and other training programs in the sector.

6.1. Summary of Key Findings

Technical and entrepreneurial competencies are complex and crucial for a developed economy. As digitalization increases, the technical requirements rise in demand and complexity. These are important for online entrepreneurship. Proficiency in digital entrepreneurship competence is a crucial skill in the practice of e-education for the modern economy. In this paper, we present the summarized results of a study investigating students' perceptions about digital entrepreneurship competence, drawing on qualitative content analysis of students' written submissions in a digital entrepreneurship training program.

As determinants of digital entrepreneurship competence, the qualitative content analysis identified and characterized a set of themes including digital literacy, digital skills, digital skeptical reflection, digital creativity, digital opportunity identification, digital innovation, digital value creation, digital risk management, and digital issues, challenges, and trends. The conceptual model points out that digital entrepreneurship competence (1) uses digital literacy, digital skills, and transformational digital knowledge during (2) reflection in digital skepticism, engaging in digital personal exploration, including available and innovative digital solutions, thus uncovering digital

entrepreneurial opportunities in everyday business; (3) adding digital value to empower digital output related to the identification of (4) feasible digital solutions to satisfy (5) specific digital targets, reducing digital financial and legal constraints, through (6) processes for the proper dissemination and (7) digital risk assessment and risk management.

6.2. Practical Recommendations for Enhancing Digital Entrepreneurship Competence

In the digital context, several research studies find that entrepreneurial experience, practical training, membership in entrepreneurship communities, and networking with other entrepreneurs all improve entrepreneurial competencies and multiliteracies. These findings have been summarized and interpreted in the practical recommendations below. They will be particularly relevant to educational specialists who are designing and delivering ECTs and PDPs, as well as career consultants working with individuals. Select practical recommendations may be of interest to entrepreneurs, enterprises, and innovators. The originality of the research lies in the empirical validation of digital entrepreneurship competence obtained during the training period. From the findings come direct practical recommendations, the most important of which include the need to improve knowledge of digital channels for product promotion and expand means of communication with clients.

Educational specialists who are designing and delivering ECTs and PDPs should remember that in the digital age, the ability of entrepreneurs and innovators to select and use various digital tools and access the right skills and competencies is especially crucial for the success of a company. Individuals who want to become or already are entrepreneurs should be encouraged to gain practical, hands-on experience. In particular, they should be taught to look at entrepreneurship through the lens of entrepreneurship marketing in order to more effectively leverage digital channels for customer engagement, communication, and participation.

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6. Appendices

Appendix 1: Training Outcomes Evaluation Questionnaires (Pretest & Posttest)

Digital Entrepreneurship Competence Evaluation This is a self-assessment. It is intended for your own use to evaluate your ability and willingness to start a project. The training program will use these results to provide you with personalized training to get you started.

1) How would you rate your ability to communicate, coordinate, and collaborate with others? 1. I usually work alone, as I mentioned before I joined this training program. (10 points) 2. I have a lot of ideas, but I haven't had much opportunity to express or develop them.

2) How would you rate your ability and tools to develop value-added skills? 1. Not very mature in core technical ability (0-2 years). 2. Have reliable technical ability and projects, and participate in some investment interactions.

3) How would you rate your ability and time for project operations? 1. No time and resources to support project development. 2. Good time and financial support for project development. 3. Able to support investment and be familiar with every process of operation.

4) How would you rate your ability in idea development, organization, and coordination? 1. The concept is scattered and needs improvement. 2. Strong organizational ability and a good corporate team.

5) How would you rate your interest in learning and potential for project development? 1. No interest in entrepreneurial skills. 2. Engaged in independent entrepreneurial activities and possess more abilities, such as investment and operation.

Appendix 2: Program Assignment Assessments Check-in Program

Check-In Program For term extension applicants, check in throughout the program.

- You must have at least 20 days of cumulative attendance in the 25-day program. - Speak to your project registration supervisor in line with the actual situation and participate in the 2-day project stage of the online training program. If you agree and accept the terms of the above program, please fill in Table 1. Table 1: Check-In Project Reply Sheet

Serial number: I agree and accept the check-in project application screen.

Please participate in the check-in program by writing your full name (with ID confirmation). If there is already a supervisor or leader, please provide confirmation of the registered project team name.

Name: ID Number:

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Each registered project is currently discussing stage 2 training and has already entered the check-in project. If the term extension application is successful, please check the stage 2 project training with the project supervisor and discuss the actual learning progress of the project candidate. If you agree and accept the terms of the above program, please fill in Table 1. Table 1: Check-In Project Reply Sheet

Serial number: I agree and accept the check-in project application screen. Please participate in the review program by writing your full name (with ID confirmation). If there is already a supervisor or leader, please provide confirmation of the registered project team name.

Name: ID Number: