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RESEARCH PAPER

Prospective Teachers' Reflection on the Development of Entrepreneurship Competences (EntreComp): A Design-Based Learning Experience

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ABSTRACT

Entrepreneurship as a competence fosters personal growth and societal progress by enabling individuals to start or expand businesses with cultural, social, economic, and commercial value-creation motives for societal betterment. The current research was conducted to explore prospective teachers' reflections based on Design-based learning (DBL) experiences to document the verification of EntreComp Competences development through qualitative research design. The 25 Prospective teachers of a public sector university were purposively selected. These selected participants were interviewed for their experiences of design-based learning to develop entrepreneurship competences aligned with the EntreComp Competences Framework presented by the European Commission in 2016. The data analyzed through the thematic analysis revealed the instructional approach, design-based learning can contribute to developing the entrepreneurship competences of prospective teachers. it is recommended using design-based learning as an instructional technique could lead to more tangible results. Furthermore, effort must be taken to obtain long-term data via learners' reflections on their design experiences.

Introduction

The top-notch universities have a major difference from the low-profile universities in that, they are the input of expert intelligentsia, processes of a smart workforce, and output of a skilled workforce for the transformation of societies and the country's future. All high-ranking universities ambition to see their youth in terms of long-haul experts. In this context, globally, in higher education, two questions are always considered for refining 21st-century learners: "What" and "How".

1. What knowledge, skills, attitudes, and values are prerequisites to shaping the future of learners, and:'

2. How an instructional methodology can promptly and effectively nurture these sets of competences traversing intended curricula?

The right answer is "Train the Trainees" proficiently and competently with new instructional maneuvers for real-world states. The teaching-learning paradigm is shifting constantly after facing genuine hurdles in lifelong learning. The new and only paradigm on which higher education and universities are working now is to transform

the lives of others and themselves by creating value through the adaptation of the Organization for Economic Cooperation and Development (OECD) Learning Framework 2030. For this reason, there is a huge call for high-profile competent teachers to address both questions by shaping prospective teachers as competent enough to proactively anticipate future opportunities, manage resources efficiently, and implement the acquired expertise in their real-world contexts. Therefore, robust, skilled teacher preparation is a vital tool to transform higher education and to upsurge the demands of our learners in related professional industries and marketplaces. Consequently, the practice of experiential learning in universities and teaching training institutions is required to support the learner in solving wicked problems through hands-on experience.

Literature Review

In educational settings and teacher education institutes much emphasis is given to learning through experience from ancient times. In the early 20th century, Dewey (1938) focused primarily on the importance of experience and, more significantly, reflection on that experience in education and teaching. He stated that learning experiences lead to personal development in his Theory of Experience. He asserted a new comprehension of the learning process and the connections between its components: the knowledge gained, people's participation and practical understanding, and the democratic principles demonstrated in non-coercive interactions. According to Dewey, learning is a process in which knowledge objects gain meaning via application, with the help of contextual elements from the experience (Holdo, 2023). Merely experience of learning cannot produce high-profile teachers; reflection on experience is a prerequisite for cracking actual challenging situations in the future. Learners' reflections on their activities, assigned tasks, behaviors during collaboration in teamwork, and attitudes toward professional matters determine their success. Reflection and learning are deeply intertwined with each other and reflections are central to integrating theoretical and practical competencies, as well as to raising awareness around implicit assumptions (Mezirow, 1997; Schön,1983). Dewey proposed in his research that the optimum approach to learning is for students to combine reflective thought with action (Miettinen, 2000).

In the 1970s, Kolb developed the current idea of experiential learning based on Dewey's work and in collaboration with other important theorists such as Lewin, Piaget, Rogers et al. (1984) claims that learning is the process through which knowledge is formed through the combination of grasping and changing experiences. In experiential learning theory, Fry and Kolb (1979) present an integrated approach to comprehending the teaching and learning process, by presenting a cycle of the learning experience. He developed the Experiential Learning Cycle, divided into four stages: concrete experience, reflexive observation, abstract conceptualization, and active experimentation. The stages of the Experience Learning Cycle help trainers and students understand how to facilitate learning more successfully through the experiential learning process (Kim, 2019).

Schon (1983), based on Dewey's work and knowing the importance of reflection on experience in teacher education, also argued that collecting reflection on that experience from participants and stakeholders during the teaching-learning process and for professional development is a key to success.

All well-known scientists, philosophers, and theorists believed in the efficacy of experience learning and reflective practices in education. Reflective practices help teachers to consider what, how, and why they reflect, allowing them to break away from

regular behavior and adapt to the requirements of the learners. These practices provide teachers with a deeper understanding of their teaching style and, as a result, increased efficacy as educators. Other specific benefits cited in the research include teacher belief support, appropriate challenges to tradition, and recognition of instruction as innovation and tolerance for heterogeneity when testing new theories to classroom practice (Pitsoe, 2013).

Reflective practices, based on experience learning, contribute to the student's real-life growth that 'really' works in their daily lives. Students benefit from increased critical thinking and the ability to make connections between theory and practice (Kolb & Kolb, 2017), as well as real-life experiences (Pittaway & Cope, 2007; Losapio & Koustas, 2017), opportunities to be more active rather than passive in their learning (Canziani et al.., 2015), opportunities to receive constant feedback, engage in collaborative discourse, and experience teamwork towards a shared goal (Meyers & Jones, 1993).

Experiential learning exercises improve learners' conceptual comprehension and serve as a scaffold for them to increase their competencies (Kim, 2019). Keeping the importance of experience learning and reflective practices in education and teaching-learning practices, experiential learning has emerged as a significant element of entrepreneurship education as academics adapt to do research that is beneficial to both real-world tasks and outside instructional strategies, such as workshops and business plan competitions, to better educate entrepreneurship. As a result, experiential learning approaches might serve as a foundation for building entrepreneurial training practices in educational institutes.

Nutshell is, on the one hand, experiential learning is the backbone for fostering the environment that helps flourish the entrepreneurship competencies and develop designs for creativities in educational organizations, teacher education institutions, and entrepreneurship entities. On the other hand, it also helps to invent novel innovative instructional practices and pedagogies by mixing different methods and techniques. Thus, it is meticulously answering the two questions: which is mentioned at the start of this paper that is "What" and "How". *What* competences are needed to shape the future of 21st-century students and *how* these competences will be acquired through an easy, productive, dynamic, and pragmatic process or method of instruction?

Now addressing these queries; first, *what* competences and *why*? According to the lifelong learning program (2007), in this era of the competence revolution, lifelong learning competences such as 1) Literacy competence; 2) Multilingual competence; 3) Competence in Science, Technology, Engineering, and Math; 4) Digital Competence, 5) Personal, Social and Learning to learn Competence; 6) Civic Competence; 7) Entrepreneurship Competence; 8) Cultural awareness and expression Competence, are considered practical. However, it is noticed by researchers that entrepreneurship competences are imperative to acquire in almost all fields of life. Thus, keeping this importance in mind, the current research is merely focusing on developing entrepreneurship as a competence among prospective teachers by employing the entrepreneurship competence framework (EntreComp). Additionally, to answer, *why* are these entrepreneurship competences? the answer is to value creation in the life of the prospective teacher and society, in addition, to making universities as well as higher education more productive to hunt competitive advantage in contrast to their competitors.

Though, second query deals with *'How'* an instructional approach or pedagogy is useful for developing these entrepreneurship competences and *why* the chosen

instructional approach? This answer results in that design-based learning is the best instructional approach and *why*– the systematic and iterative process makes prospective teachers more active, trains them as real-life problem solvers of ill-defined (wicked) problems in routines, and develops their skills of designing their learning practices more rapidly by adding their reflection related to experience.

Entrepreneurship Competence (EntreComp) Framework

Entrepreneurship competence is defined as the collection of knowledge, skills, attitudes, and motivational characteristics that assist individuals in dealing more effectively with the world's growing globalization, unpredictability, and complexity (Gibb 2002a, 2002b; Lackéus, 2015). It is imperative to enhance each learner's capacity to form their future well-being (OECD, 2019). In 2016, the Joint Research Center (JRC) conducted a study under the banner of the DG Employment, Social Affairs, and Inclusion to identify a consistent strategy to support the development of entrepreneurship as a competence recognized as the entrepreneurship competence framework (EntreComp). The EntreComp framework (2016) defines entrepreneurship as a transversal competence that citizens may use in all aspects of their lives, from personal growth to energetically engaging in society to re-entering the labor market as an employee or self-employed individual and starting up businesses (cultural, social, or commercial). The EntreComp Framework (2016) encompasses three competence areas and fifteen competences, as shown in the figure below.
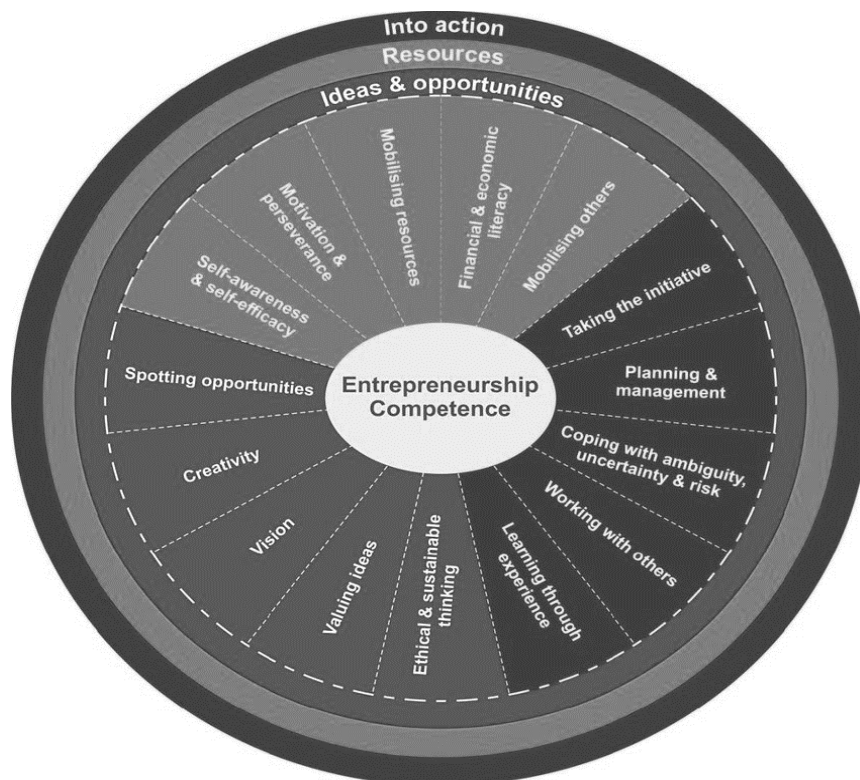

Figure 1: Areas and Competences of EntreComp Framework

Source: European Entrepreneurship Competency Framework

The EntreComp Framework is made up of 03 competence areas and each area includes 05 competences, which, together, are the building blocks of entrepreneurship

as a competence (Bacigalupo, Kampylis, Punie, Godelieve & Brande, 2016). These areas include (A) Ideas and opportunities, (B) Resources, and (C) putting Ideas into action. The five sub-competences under each area are as follows:

Ideas and Opportunities

This area consists of competences such as: Spotting opportunities creativity, vision, valuing ideas, and ethical and sustainable thinking.

Resources

The area of resources consists of self-awareness and self-efficacy, motivation and perseverance, mobilizing resources, financial and economic literacy, and mobilizing others.

Into Action

This area includes competences of taking the initiative, planning, and management, coping with ambiguity, uncertainty, and risk, working with others, and learning through experience.

In the current research study, Entrepreneurship competences were developed by combining all of these groupings/areas. The EntreComp can be utilized as a framework for curriculum development in the formal education and training sector. It may also be used for non-formal learning activities and initiatives e.g. to encourage entrepreneurship inside established institutions. It seeks to construct a link between the educational realms and employment in terms of entrepreneurship as a competence. This competence framework serves as the base for entrepreneurial education at all levels, from elementary school to university. Based on this, it is obvious that people charged with creating certain competences in trainees must themselves exhibit similar competences. As a consequence, entrepreneurship education is critical for teachers (Stamatović & Zlatić, 2021).

Design-Based Learning

Design-based Learning (DBL) is an instructive technique in which pupils gather and use theoretical knowledge to solve design challenges (Puente, Eijck, & Jochems., 2014). As an educational technique, Mehalik and Schunn (2006) stress that DBL exercises include pupils in resolving genuine design challenges. DBL integrates pedagogical principles from problem-based learning and applies them to design projects that can assist pupils in improving their analytical and problem-solving abilities (Puente, Eijck, & Jochems, 2013). After experiencing lifelong challenges genuinely, in the 21st century, prospective teachers and students of higher education need to develop their abstract ideas, and imagination into concrete skills, in such a way they can seek opportunities from undesirable situations in their lives and reflect competitive advantage in every outlook of their survival. DBL is used in higher education to improve inquiry skills that are combined with academic knowledge by answering ill-defined questions (Kolodner, Camp, Crismond, et al., 2003).

DBL instruction are grounded in design thinking. Design thinking is a non-linear but dynamic paradigm (Scheer, Noweski, & Meinel, 2012). Carroll, Goldman, Britos, et al. (2010) defined design thinking as a learning approach that concentrates on increasing students' creative confidence and in which participants participate in hands-on design challenges that focus on creating empathy, stimulating ideation, developing

metacognition competences, and fostering creative problem-solving. It serves as a necessary process for resolving practical, creative challenges or issues to reach a better future outcome (Cohen, 2014, as cited in Lor, 2017). It does not follow the sequential waterfall model, since it is an iterative process, in which development is viewed as pouring downhill. The main point is to fail quickly to learn from mistakes and swiftly iterate to avoid missing chances and wasting resources (Carroll, et al., 2010). Thus, supporters of design thinking suggest that students should be taught to think like designers to improve their creativity and grasp of the innovation process (Retna, 2016).

Although there are several models of the design thinking process in the literature, the Stanford d. School design thinking process was the focus of the study (Brown, 2008). "Design Thinking" was the title of an article written by IDEO CEO Brown for the Harvard Business Review in 2008. According to him, design thinking is a cooperative, problem-solving methodology that puts people first. The five non-linear steps of Brown's design thinking process are as follows: (1) Empathize; (2) Define; (3) Ideate; (4) Prototype; and (5) Test (Brown, 2008).

Empathize: Understand the People/Users

   a. *What to empathize:* to unpack the users/people's needs and the context of their problems

   b. *Why empathize*: to observe people who they are, what they think, what is important to them, and what values & beliefs they hold

   c. *How to empathize*: observing their behavior, engaging them in short intercept and longer scheduled conversations, in addition, watching and listening to people by combining observation and engagement

   Transition in the process: Empathize to define

2. **Define:** Frame the People/Users' Problems Statement to Design Right Solutions

   a. *What to define:* to craft sensemaking, meaningful and discrete problem statement

   b. *Why define:* to design actionable solutions by addressing peoples' points of view and expressions

   c. *How to define:* articulating people's needs by observing emerging patterns of their feelings, Synthesizing and prioritizing a set of their needs, developing insights through extracting their points of view

   Transition in the process: Define to ideate

3. **Ideate:** Generate Ideas to fuel design solutions

   a. *What to ideate:* to go a little wider in extracting impressions and outcomes of people/users

   b. *Why ideate:* to source obvious and innovative solutions which are having fluency and flexibility

    c. *How to ideate:* brainstorming and combining rational concepts and thoughts with imagination

Transition in the process: Ideate to prototype

4. **Prototype:** Build and iterate quick artifacts to test a closer design to the final solution

    a. *What to prototype:* to iterative generation of artifacts to answer intended questions of people/users

    b. *Why prototype:* to communicate, to fail quickly and cheaply, to test possibilities, and manage solutions-building process

    c. *How to prototype:* get started, build a tangible solution, and respect the meaningful feedback of people/users

Transition in the process: Prototype to test

5. **Test:** Examine, Try the Solutions out to Learn, and Reexamine

    a. *What to* test*:* to examine the prototype and potential solutions, Soliciting feedback from people/users' empathy mode

    b. *Why test:* to refine prototype and solutions, to get the solution right after refining your points of view regarding the design solution

    c. *How to test:* put the prototype in your user's hands, let them interpret it within their experience after using it, build multiple prototypes to make comparisons, and reveal final solutions

Transition in the process: Iterate the process when needed during five stages.

Material and Methods

The following methods and procedures were used in the research process.

The 25 prospective teachers of the BS Education Program were sampled as participants. The researcher employed a purposive sampling strategy whereby the prospective teachers were engaged in ongoing training of professional development in a public sector university.

Instrumentation

In this qualitative study, the data was collected through interviews from the sample, to grasp the reflection of prospective teachers regarding DBL in developing their EntreComp competences. An open-ended interview protocol was prepared by the researcher. The credibility of the open-ended interview protocol was assured by the expert review. Interviews occurred in their place on a prearranged and mutually agreed day. Videos of their interviews were recorded with participants' written consent. However, Prospective teachers were free to share their perspectives throughout their learning experiences. What they enjoyed a lot was what was hectic or boring about the DBL experiences. They reflected openly on each step of the design-based learning

process. The researcher probed the questions where appropriate, to explore the main research question of the study.

Results and Discussion

Thematic analysis was manually finalized to interpret the reflection of learners about their DBL experiences. The process of thematic analysis started with coding the gathered data from interviews. Small chunks of information were labeled that is called codes. *Initially*, Codes replicate the original meaning of interview data given by prospective teachers. The researcher rechecked the assigned codes and merged the overlapped/matched codes. After that researcher made patterns based on the cluster of similar codes. The pattern codes were revised according to the appropriateness of the conceptual framework of the research study. *Secondly*, the jotting was carried out by using comments to highlight the underlying themes to analyze data without making errors. Highlighting all the important responses enables the researcher to create the connectivity between the responses of an interview and its interpretation. *Thirdly*, memos were written by analyzing reflective notes. Data was processed through synthesized, merged, differentiated, and reviewed to extract sensible clarification of findings to make a final report. *Finally*, after reporting, patterns were further rectified to interpret the responses, these assertions and prepositions were made to validate decisions about conclusions (Miles, Huberman & Saldaña, 2014).

The results of the thematic analysis from the prospective teachers revealed as following:

Table 1
Prospective Teachers' Reflection Regarding DBL Learning Experience and Entrepreneurship Competences

Sr #	DBL Process	Entrepreneurship Competences Areas	Themes	Original Response
1	Empathize	1. Ideas and opportunity	Ideas for Change	S1: I was able to produce diverse ideas, even though it was impossible I wanted to change the entire education system. S9: I also learned how to benefit society and create monetary and social value in others' lives with little help. S21: I can be flexible, welcome change, and work for this change.
2	Empathize	1. Ideas and opportunity	Finding Opportunities	S6: After this task, I was able to find the Strengths, weaknesses, opportunities, threats, and risks I can face in my life.
3	Define	3. Into action	Taking Initiatives	S1: I sensed taking the first step to produce an idea was a good decision… I was appreciated by my teacher for taking the initiative in the class. S24: Although my idea was poor in the class…but I dare to put it before others.

4	Define	1. Ideas and opportunity	Critical Thinking	S2: I feel I have some differences in my way of thinking… S7: I developed the insight into how to talk with someone and simply guide them. S12: I was thinking critically and creatively S13: We were able to find external factors which may affect our business idea in the future. S22: I explored an innovative sense in me
5	Ideate	1. Ideas and opportunity	Creativity	S6: I feel confident enough to say I can generate ideas independently. S24: during my project, I have experienced one idea that can serve many dimensions…and diverse ideas can serve one dimension of different projects.
6	Ideate	2. Resources 3. Into Action	Collaboration	S2: Working in groups tolerating others' behaviors and reacting patiently was my great performance. S15: I have to do every task especially if we are working in teams.
7	Ideate	2. Resources	Motivation	S3: I have learned there is nothing special in the comfort zone, if we want some recognition in life we must go through hard times. S5: I understand positive motivation is key to success…we can encourage each other and can enjoy work by speaking gently. S10: I feel that I am also able a take part in different circumstances in a productive manner.
8	Prototype	3. Into Action	Management Skills	S21: I can plan, organize, and coordinate stuff and people in a manageable manner.
9	Prototype	2. Resources	Confidence	S3: I developed confidence in myself… S4: My first time working in teams enabled me to communicate…without any hesitation. S6: I feel confident enough… S8: Develop confidence. S23: when I was making different sketches for my project, I felt I was doing something special…I was proud to do it.
10	Prototype	3. Into Action	Time Management	S15: I learned time management. S19: to manage time. S25: At first, I was not able to complete my tasks I was facing a hard time managing things and deadlines...it is difficult…but we can.
11	Prototype	3. Int Action	Problem-Solving	S6: I am aware there are many alternative solutions to one problem. In this way I create. Alternatives…independently. S7: A little but at least I can contribute to handling difficult situations in my life and others too.

				S17: made me confident in making the substitutes
12	Test	3. Resources	Communication Skill	S9: I feel my communication skills are better. S11: with the passage of time, I have a feeling two-way communication is more important to succeed in your projects. S14: I have much confidence in communicating. S16: develop our relations with others and expand our networking. S18: Making interaction with team members polish my communication skills.
13	Test	2. Resources	Self-Awareness	S6: After this task, I was able to find my Strengths, weaknesses, opportunities and threats, and risks I can face in my life. S25: when I was doing a group project, I felt I could take more than one responsibility at a time which my peers hesitate to accept.
14	Test	3. Into Action	Bona fide experience	S20: we imagine and produce hands-on experience based on that imagination. S23: during the project, I practiced to do list…. what to do and what to avoid…made me more sensible.

Table 1 presents themes that emerged from prospective teachers' reflections regarding their DBL experiences and entrepreneurship competences after the completion of the project. It also represents the DBL process and three areas of the EntreComp framework. The emerging themes are ideas for change, finding opportunities, taking initiative, critical thinking, creativity, collaboration, motivation, management skills, confidence, time management, problem-solving, communication skills, self-awareness, and bona fide experience. Detail is given below.

Ideas for Change

According to the participants of the study, with the help of design-based learning, they learn how to create ideas to bring change in their environment (see Table 1; S1, S9 & S21).

Finding opportunities

One participant in the study stated that after gaining the DBL experience he/she can scan opportunities from the surrounding environment (see Table 1; S6)

Taking Initiative

A few participants in the study stated that they learned how to take Initiative for any task during the design-based learning project (see Table 1; S1, S24).

Critical Thinking

Most of the participants of the study feel that their critical thinking becomes enhanced with the help of design-based learning (see Table 1; S2, S7, S12, S13 & S22).

Creativity

Participants of the study also said that their creativity was boosted due to participation in this design-based learning (see Table 1; S6 & S24)

Collaboration

According to the participants of the study, they also learned collaboration or working with diverse personalities in design-based learning (see Table 1; S2 & S15).

Motivation

Participants of the study revealed motivation made them more motivated than before and that nothing is impossible after undergoing the Design- based learning experience (see Table 1; S3, S5, S10)

Management Skills

According to one of the participants of the study, she experienced real-life management work through this design-based learning project (see Table 1; S21).

Confidence

The Participants of the study shared that design-based learning intervention-based projects made them more confident than before (see Table 1; S3, S4, S6, S8 & S23).

Time Management

Participants of the study shared that they also learned time management skills in this design-based learning project (see Table 1; S15, S19 & S25).

Problem-Solving

Participants of the study also learned problem-solving skills in this design-based learning project (see Table 1; S6, S7 & S17).

Communication Skill

According to the participants of the study, the DBL intervention-based project enhanced their communication skills (see Table 1; S9, S11, S14, S16 & S18).

Self-Awareness

According to the participants of the study, the DBL intervention-based project enhanced their self-awareness (see Table 1; S6 & S25).

Bona fide Experience

The participants of the study stated that they got practical knowledge; it was like real-life working experience in design-based learning intervention-based projects (see Table 1; S20 & S23).

Discussions

The thematic analysis shows the reflection of prospective teachers regarding project-based learning effects on the development of their entrepreneurship competences. Their perceptions are a piece of clear evidence that design-based learning

enhanced not just entrepreneurship competences but also improved some other desirable competences needed to perform professional duties and self-grooming. It was shared by the participants and noticed by the researcher that the following competences were enhanced through this project-based learning i.e., design-based learning. These competences are; ideas for change, taking initiative, critical thinking, creativity, collaboration, confidence, finding opportunities, motivation, problem-solving skills, communication skills, time management skills, bona fide experience, and management skills. Let's discuss and compare them with international previous research one by one.

An entrepreneurial mindset is characterized as the capacity to recognize, act, and mobilize quickly, especially under uncertain circumstances (Ireland, Hitt, & Sirmon, 2003). It is essential to plan and start work to accomplish a goal. Ivanova (2019) stated that project work fosters students' critical thinking power. They become capable of mind mapping and generating blueprints of a project. They are capable of exploring, designing, and prototyping to achieve project outcomes. She stated that this approach helps to develop entrepreneurship thinking. Similarly, the findings of this study show that this project-based course appears to have created the setting for generating ideas, working, and achieving aims. The students seemed to have been interested and appreciated the opportunity to study in this way.

Prospective teachers reported that their ability to think for scanning opportunities from the surroundings, solutions for value creation self and others' lives, and accomplish tasks on time has increased. The prospective teachers' learning improved as they reflected on their progress throughout the course and project work. Teachers have also observed an increase in the quality of concepts in the new course compared to the previous one (Linton &Klinton, 2019). Similarly, the qualitative thematic analysis shows that participants of the study are creating ideas more frequently than before as well as in diverse ways. The design thinking process boosts their creative capabilities too. They are more creative during and after the project than they were before the project. Although in the initial days of the project, they felt it was a burden and stressful or things that had not happened before to them, over time they handled it interestingly.

According to Amabile and Kramer (2011), the combination of task accomplishments and time constraints is a difficult process. Balancing this difficulty does not become overpowering and the entrepreneur cannot deliberately handle it. Muhe and Tawe (2016) study is also in line with Amabile and Kramer (2011) study. Muhe and Tawe (2016) stated that designed entrepreneurial learning equips students with productive and managerial skills. Ivanova (2019) also stated that project work gave students practical learning experience in entrepreneurial management. Chemborisova, Litinski, Almetkina, et al., (2019) experimental study was also in line with the above study regarding business experience. Chemborisova stated that task-based learning increased experimental group student business consultancy skills.

Similarly, the findings of this study established the understanding that real-life learning experiences enhanced the multiple skills of the students. Such as, before doing this project, prospective teachers were not able to manage the time to accomplish a goal quickly. They were not able to perform managerial responsibilities; were reluctant to communicate and convince others to purchase goods from them; cooperate with colleagues etc. This project makes the prospective teachers able to perform managerial tasks at a given time.

A study conducted by Ivanova (2019) revealed in a project-based learning approach that the majority of students were capable of working independently on a range of team projects relevant to the project's theme. Correspondingly, in this study, the researcher found that a majority of prospective teachers were struggling and felt uncomfortable engaging themselves in the projects, with colleagues and learners in schools and universities, particularly at the start of the process. However, at the end of the project, they looked to be considerably more at ease with this technique. This shows that they have gained confidence.

According to Blumenfeld Soloway, Marx, et al., (1991), in project work, students discover and explore remedies to issues through various activities. Botha, (2010) also stated that project-based learning places students in actual problem-solving contexts where they may collaborate in groups or teams to solve issues, preferably outdoors in the school and over a long-time frame (Botha, 2010). Moreover, a study conducted by Ivanova (2019) also proved that design thinking is viewed as a creative problem-solving method that effectively fosters important 21st-century abilities and educates students to be collaborative, imaginative, and entrepreneurial.

In the same way, the results of this study have shared evidence that design-based learning enhanced prospective teachers' problem-solving skills. Before they participate in the project they cannot think and find solutions to problems but during attending to and completing design-based tasks and following steps they reflect their progress in this regard reportedly augmented. They suggested and utilized multiple solutions to their peer, learners, and their parents regarding different problems. They successfully used new solutions to encounter project-related problems. Two students even said they helped their parents' businesses after practicing SWOT analysis during the DBL project as their parents were working in small businesses and trying to improve their business strategy after SWOT analysis of their businesses. They came to know what are their strengths and weaknesses and where they can find more opportunities to flourish their business. In addition, what threats and problems do they have to handle in the near future? Even they discussed with their children (two prospective teachers- participants in the DBL intervention) how to brand their business more attractively.

Another crucial aspect of project work and design-based learning is students' ability to take the initiative to perform a task. Multiple studies showed that design-based learning pushed students to take initiative for the new project. For example, Frank, Lavy, and Elata (2003) Boss, Suzie and Krauss in 2007, Thompson and Beak in 2007, and Ivanova (2019) stated that project work encouraged students to take initiative. The findings of this study are in line with the study of Ivanova. Students felt hesitation to take charge of practical work, particularly outside the classrooms. These projects make them confident enough to make decisions and step forward to complete the assigned task. Before the project, they felt shy and had a problem asking for guidelines and sharing their suggestions and ideas. But while working on the project, they became courageous to ask for help, offer help, and take responsibility to accomplish assigned work. After gaining experience in the DBL process, all of the prospective teachers engaged in the project were pleased with their efforts and expressed a commitment to participate in future initiatives. Performing projects with an emphasis on entrepreneurship proved to be a successful endeavor that benefited students while also creating new interesting possibilities for innovative, self-directed, and motivating learning experiences.

Linton and Klinton (2019) mentioned Kirzner (1973) research. They stated according to Kirzner (1973) classic entrepreneurial theory assumes that opportunities

already exist and that one must be aware to find them. Linton and Klinton (2019) also stated that generating opportunities was later highlighted in entrepreneurship studies by Alvarez and Barney in 2007, and the focus switched from planning and prediction to the post-idea phase of the creation of possibilities. The study showed that prospective teachers become more focused on generating opportunities than finding already existing opportunities. Chemborisova et al. (2019) stated that task-based learning experiments increased skill in finding and creating opportunities for bossiness.

In contrast, the findings of the study show that prospective teachers are not focused on generating opportunities but they can find already existing opportunities. This is the only aspect of entrepreneurship competences where students are less focused. They were busy finding out the existing opportunities for utilization. Sidhu and Deletraz (2015), stated the observation and outcomes of their study stated that their presented course forced students to leave their comfort zone and enter into the challenging zone. However, when students leave their comfort zone, they enter a panic state. They felt stressed, and they had a rotten learning experience.

This was evident at the start of the DBL experience; prospective teachers expressed both emotional and physical anxiety. However, after gaining the DBL experience, most prospective teachers looked to have accepted the challenge, took the risks, and expressed a sense of accomplishment. Research conducted by Chemborisova et al. (2019) also showed that task-based learning experiments increased the skills of students regarding taking risks in business and decision-making. Likewise, the participants of this study had the same experience. They do not want to leave their comfort zone and work in a challenging environment. They became stressed and wanted to leave the project. But after some time, they accepted the situation and started putting in the effort. At the end of the project, they reported a success story. This is another piece of evidence that project-based learning supports students to gain entrepreneurship competences.

Chemborisova, et al. (2019) stated that task-based learning increased the experimental group's student communication skill than the control group. Similarly, the findings of this study show that students' communication skills are enhanced through design-based projects. The findings of this study support the Chemborisova study. Prospective teachers become more confident in communicating with their parents, instructors, peers, and staff. They are talking with confidence to express their knowledge, ideas, suggestions, and solutions regarding projects and other related activities. They also reported they become more expressive than before.

Conclusion

The purpose of this study is to contribute to the infinite research on this problem by assessing how students react to the experience of participating in a course that emphasizes the development of entrepreneurship through design thinking. According to the information, prospective teachers thought the course was useful and compelling. This project reveals prospective teachers' insight into their selves and potential. How they perceived what they were, how they thought, and what change they brought in their thinking and behavior through this DBL process.

The findings of this study imply that DBL which has tenets in design thinking is one of the approaches that would seem to enhance entrepreneurship skills as well as several key competences in university students or prospective teachers. Nonetheless, the findings imply that this coursework aided students in developing such competences. The

students emphasized the importance of knowledge and skill development as important aspects of the experience. The reflections addressed the growth of entrepreneurship knowledge as well as the theoretical components of design thinking as a process. Furthermore, most of the learning was tangible and focused on building relevant skills like collaboration, interpersonal communication, connecting, compassion, transforming ways of thinking, and dealing with ambiguity. Students stated that they were thinking and acting differently as a result of what they had learned in the course and that they saw opportunities to implement what they had learned in real life and their future professions.

The actual corporate world is a work site of scientists, educationalists, and engineers. It needs personal and professional competency to work there. Without any experience working there can be more challenging and problem-creating. Therefore, it is necessary to force the young generation to get out of their comfort zone in a supporting, creative, and secure educational atmosphere that prepares them for the actual world's awareness and futuristic responsibilities. This study and its findings represent a potential opening point for the design of an educational plan that will enable the execution of the EntreComp framework to create a training and education system that will help prospective teachers acquire the knowledge, skills, and attitudes required to develop workable entrepreneurship competences.

Recommendations

It is recommended that Implementation of design-based learning as an instructional approach may generate more tangible results. Therefore, attention must be paid to getting the long-run data through the reflection of learners on their design experience.

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