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Designing Learning Content and Experiences for Innovative Higher Education to Foster Soft Skills

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Abstract

To cope with upcoming challenges in education, almost all the higher educational institutes have reached a consensus on reforming their pedagogical methods to foster creativity and innovation for both learners and educators. In line with this, we need to raise fundamental questions about why we learn, how, and what to teach. This study proposes a procedural method for designing learning content for innovative education to foster soft skills in higher education. This study adopted an extensive systemic literature review to suggests a pedagogical approach to designing and co-designing the learning content and learning experience based on the learning objective level. This process consists of six steps: 1) extracting the topics to learn, 2) setting the objectives of learning, 3) designing the learning content and learning experience, 4) reflecting on the educational practices, 5) assessing the learning experiences, and 6) redesigning by co-creating. This research developed a blended learning course using an online learning platform to share the content as open resources. The results of this research, as a form of a course content, are implemented in a usual educational setting in a higher educational institute as a pilot study, and to be co-developed with appropriate learning content and pedagogical methods in further research for innovative education.

Keywords: innovative education, learning content, pedagogical methods, learning experiences, online course design

1. Introduction

Although many of the higher education institutes (HEIs) face difficulties in recruiting students due to low birth rates and over-supply of educational institutions, global society continually needs for higher education (Roser & Ortiz-Ospina, 2018). As we transition into a technologically advanced society brought by the so-called "the fourth industrial revolution," technological advancements significantly shape our socio-economical system, making generating novel ideas, knowledge, and innovations more cruicial. Consequently, nearly all

HEIs have reached a consensus on reforming their curriculum to cope with future challenges (Johnson et al., 2016).

However, there has been insufficient research on developing pedagogical methods for designing learning content and learning experiences for the innovative education in HEIs. In this regard, this study raises fundamental questions regarding why, how, and what to educate and learn to develop a process for designing learning resources for innovative education. Furthermore, it would ultimately suggest a global network of university-industry-government-society collaboration from the perspective of quad helix innovation models for sustainable development (Kimatu, 2016) for pedagogical development to foster innovative next-generation leaders.

2. Literature review

Facing highly complex challenges, educators have developed various pedagogical approaches in their course design, such as topic-based, inquiry-based, problem-based, and discussion-based approaches in their course design (Sadler, 2004). An integrated course design (ICD) was proposed to provide students with significant learning experiences (Fink, 2007). Bloom and Krathwohl (1971) established a framework for categorizing educational goals, known as Bloom's taxonomy of Educational Objectives, as a pyramid of remembering, understanding, applying, analyzing, evaluating, and creating. This taxonomy has been revised and modified into several versions, considering the processing levels and knowledge domains (Anderson et al., 2001; Dubas & Toledo, 2016). Souitaris et al. (Souitaris, Zerbinati, & Al-Laham, 2007) classified the benefits of entrepreneurship education programs into three dimensions: inspiration, learning, and incubating resources.

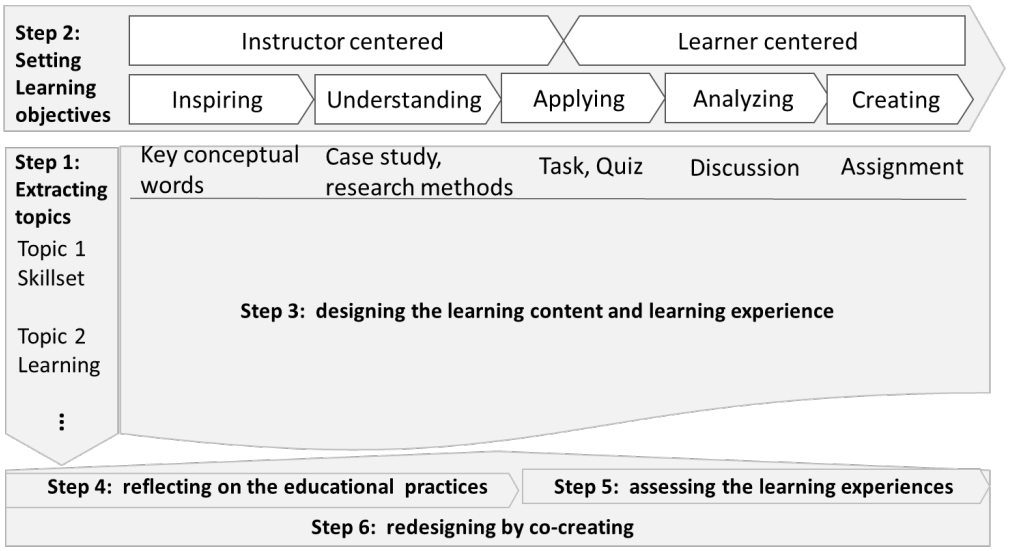
Several HEIs have been developed and implemented in various educational programs to foster creativity and innovation skills. However, little attention has been paid to the development of pedagogical approaches in teaching, learning, and supporting practices that enhance faculty competence and skills to improve the quality of education (Kim, 2016; Kim & Beuran, 2018).

In the following section, this study illustrates the key steps in developing learning resources for innovative education.

3. Methods

This research proposes a framework for developing learning resources for innovative education with 6 steps : 1) extracting the topics to learn; 2) setting the objectives of learning; 3) designing the learning content and learning experience; 4) reflecting on the educational practices; 5) assessing the learning experiences; 6) redesigning by co-creating as shown in Figure 1.

Figure 1: A proposed framework for developing learning content and experience



The six steps are not a closed single cycle of the process, but a type of infinite open cycle that can expand, grow, and be modified by open collaboration.

The following section explains how each step can be developed and implemented.

4. Results

4.1 Step 1: Extracting the topics

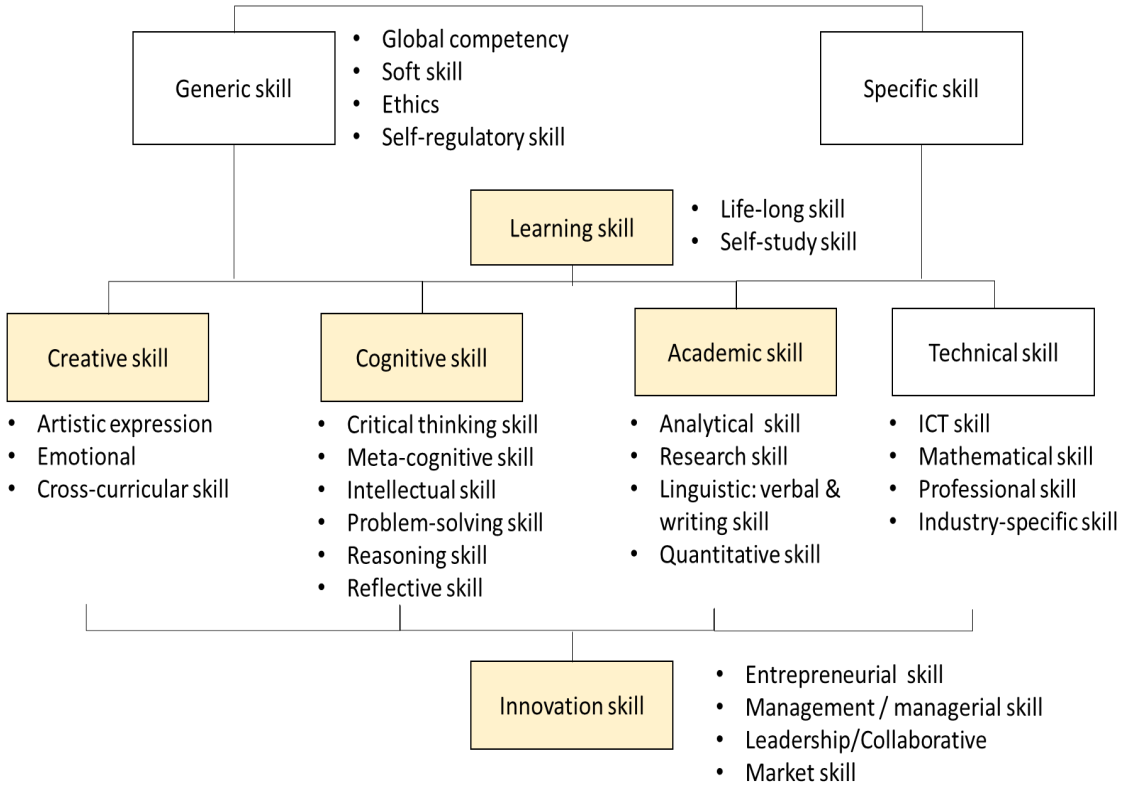
To conduct a systemic literature review, all related academic papers were searched for in the Web of Science Core Collection database, using the keywords "higher education," and "skills," and "learning" used to narrow down the topic of the research. The criteria specified that the papers had to have been published between 2010 and 2020 and fall under the education category. The search yielded 4,135 papers, of which 1,000 papers were selected for analysis based on the relevance of the topic. For qualitative analysis and to extract key conceptual words related to the skills from the existing research, all the selected references were imported into the qualitative analysis software tool, Nvivo12. This allowed for exploration of key concepts and identification of highlighted skill sets from recent studies. Using the "Text search" query to find occurrences of the concept, numerous words that appeared alongside "skill" were identified on the left side of the word-tree (see Figure 2).

Figure 2: Word-tree of "skills" and its related words which appeared in the relevant papers (1,000 records)

Due to the abundance of correlated words appearing in the length-based on the alphabetical order in the word-tree analysis, Figure 3 displays only a small part of the word-tree in the center. The skills investigated in recent studies are listed as follows: academic, analytical, artistic expression, cognitive, collaborative, communication, critical thinking, creative, cross-curricular, emotional, employability, entrepreneurial, ethics and responsibility, generic, global competency, human innovation, leadership, learning, life-long, linguistic, ICT, intellectual, interpersonal, management/managerial, mathematical, market, metacognitive, practical, procedural, professional, quantitative, reasoning, reflective, research, self-regulatory, soft, problem-solving, industry-specific, self-study, technical, verbal, and writing skills (Kim et al., 2021).

In the existing research, 41 skills were stressed to foster future leaders through educational programs provided by HEIs. Here, we need to refine the number of skills according to their meanings and relationships with each other. Broadly, all the skills can be divided into two dimensions: generic and specific. Most of the listed skills include both generic and specific attributes; however, based on their definitions and relationships with other skills, they can be structurized and categorized, as shown in Figure 3.

Figure 3: Relationship between the skills to learn

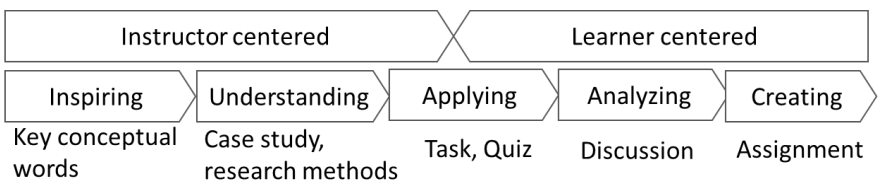


As highlighted in Figure 3, this research initially selected ten relevant topics to develop learning resources for innovative education focusing on the soft skills: 1) skill set, 2) learning, 3) flow, 4) creativity, 5) creative cognitive process, 6) disruptive innovation, 7) types of innovation, 8) thinking skills, 9) design thinking, and 10) innovation in learning.

4.2 Step 2: Setting learning objectives

By integrating Bloom's taxonomy (Bloom & Krathwohl, 1971) and its revisions (Anderson et al., 2001; Dubas & Toledo, 2016) with the categories of Souitaris et al. (2007), this study sets the learning objectives, as shown in Figure 4. In accordance with each objective, the type of learning content will be developed as follows: Inspiring - introducing key conceptual words that motivate students to learn the topic; understanding - explaining the concepts with various case studies, theoretical findings, design of research data collection method to acquire knowledge on the topic; applying - conducting a simple task, practicing, solving quizzes utilizing the acquired knowledge, analyzing – facilitating and participating in group activities and discussion to learn from peers; and creating - conducting assignments to generate new ideas on the topic.

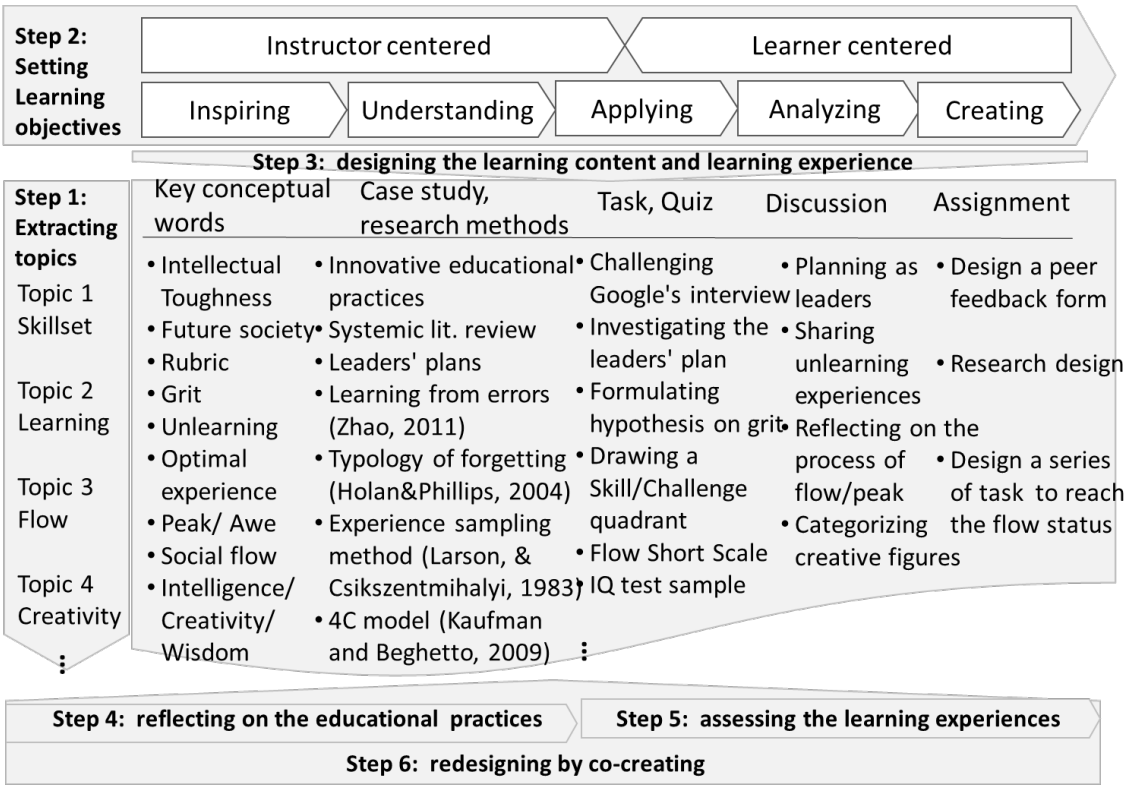
Figure 4: Learning objectives setting for the learning content design



4.3 Step 3: Designing the learning content and learning experiences

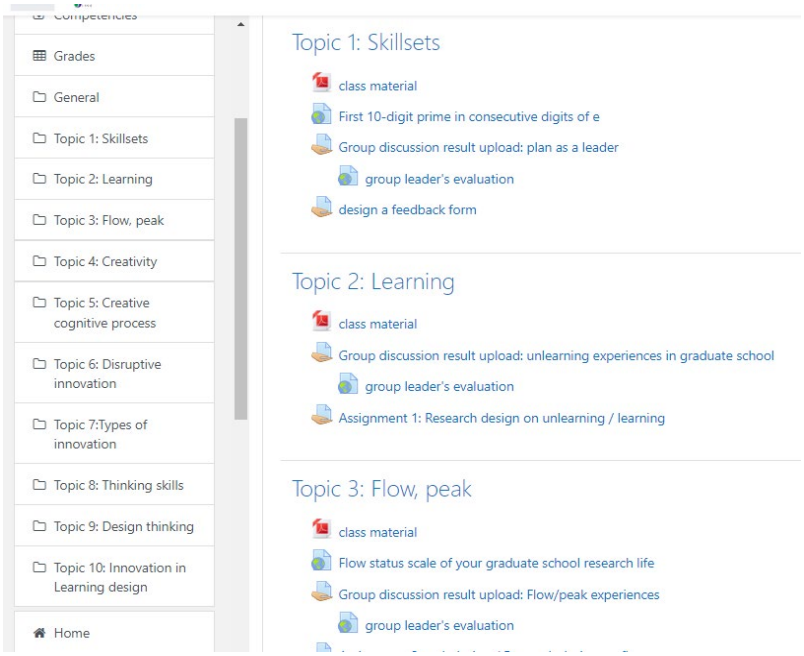
Based on the ten topics selected in Step 1 and the five learning objectives in Step 2, this study conducted an extensive literature review. The outcome of this review was the identification of 37 inspiring key conceptual words, more than 100 related theories, case studies, educational practices, and related research design methods. These findings are slated for introducing and teaching during the initial stage of our future research, which will commence with a pilot study. In addition, 22 tasks and quizzes, 13 themes for group activities and discussion, and eight assignments were designed for learners, as shown in Figure 5, for example.

Figure 5: An example list of the designed learning content and learning experience



As a result, this research developed an online course using the Moodle platform to communicate and collect the educational data, based on the developed learning content developed in this stage (Figure 6). Each topic can be a class of two hours, including tasks, group activities and discussions. Considering the designated duration and goal of the course, an instructor can select the number of topics and learning contents to be taught to redesign the course.

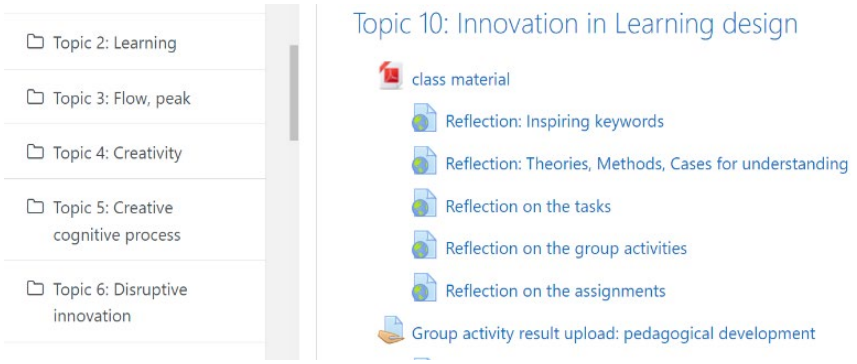
Figure 6: An online course development using Moodle platform



4.4 Step 4: Reflecting on the educational practices

Following the development of the learning content, it must be implemented into standard educational practices. Feedback and assessment are then sought through reflection on the learning content and the learning objectives. In this step, learners were asked to review all the list of learning content they had encountered since the start of the course, engaging them in the feedback and assessment process (Figure 7).

Figure 7: Reflection survey on the learning content and learning experience of the course



The reflection survey questionnaire on the learning content was created using Google Forms. Learners were prompted to indicate the extent to which the learning objectives were achieved by the learning content presented and explained by the instructor (Figure 8).

Figure 8: Reflection survey questionnaire on the learning content for understanding the topic

How much are the theories, research methods, cases helpful for understanding the topic, or insightful for designing your own research? *

	Hard to remember	Not so much helpful or insightful	Helpful but not insightful	Insightful but not helpful	Helpful and insightful	Hard to answer
Innovative educational practices	○	○	○	○	○	○
Systemic literature review on skillsets	○	○	○	○	○	○
Laeders' governmental plans	○	○	○	○	○	○
Learning from errors (Zhao, 2011) - Structural Equation Modeling	○	○	○	○	○	○
Taxonomy of Educational Objectives	○	○	○	○	○	○
Organization's Learning Culture Questionnaire	○	○	○	○	○	○

4.5 Step 5: Assessing the learning experiences

As outlined in the previous subsection, this research developed various types of learning content rooted in five learning objectives: inspiring keywords, understanding theories, case studies, and research design methods, applying tasks and quizzes, analyzing group activities and discussion, and creating assignments. The application, analysis, and creating phases requires heightened learner engagement to facilitate a substantial learning experience (Fink, 2013).

Learning experiences on each task and group activity will be assessed by learners as shown in Figure 9, in two dimensions of enjoyability and meaningfulness learned from the key conceptual word "optimal experience" in the topic 3: Flow (Csikszentmihalyi, 1990).

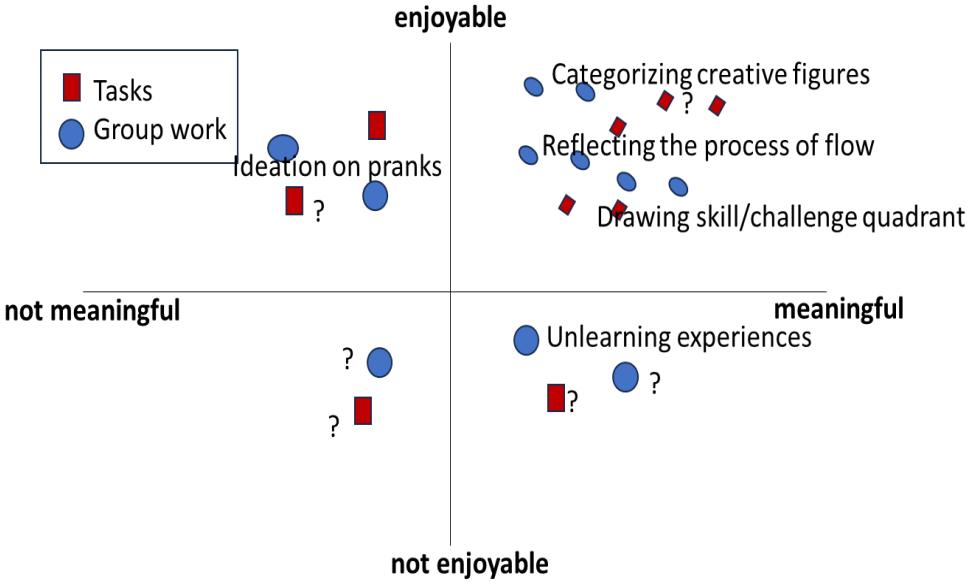
Figure 9: Reflection survey questionnaire on the learning content for creating optimal learning experiences

How much were the group activities enjoyable / meaningful for learning the topic? *

	Hard to remember(or I didn't do)	Not enjoyable nor meaningful	Enjoyable, but not so much meaningful learning	meaningful learning, but not so much enjoyable	Enjoyable and meaningful learning	Hard to answer
Planning as leaders	○	○	○	○	○	○
Sharing unlearning experiences in graduate school	○	○	○	○	○	○
Reflecting on the process of reaching flow/peak	○	○	○	○	○	○
Categorizing creative figures	○	○	○	○	○	○

After collecting the empirical learning assessment data, we score each task and group activity by numerically counting the majority of respondents who evaluated whether they had enjoyable and meaningful learning experiences in the task and activity. As a result, each task and group activity can be categorized using a 2x2 classification matrix (Figure 10) : Quadrant I) optimal learning experience; Quadrant II) enjoyable learning experience; Quadrant III) apathetic learning experience; and Quadrant IV) meaningful learning experience.

Figure 10: An exemplary format of assessing the learning experiences



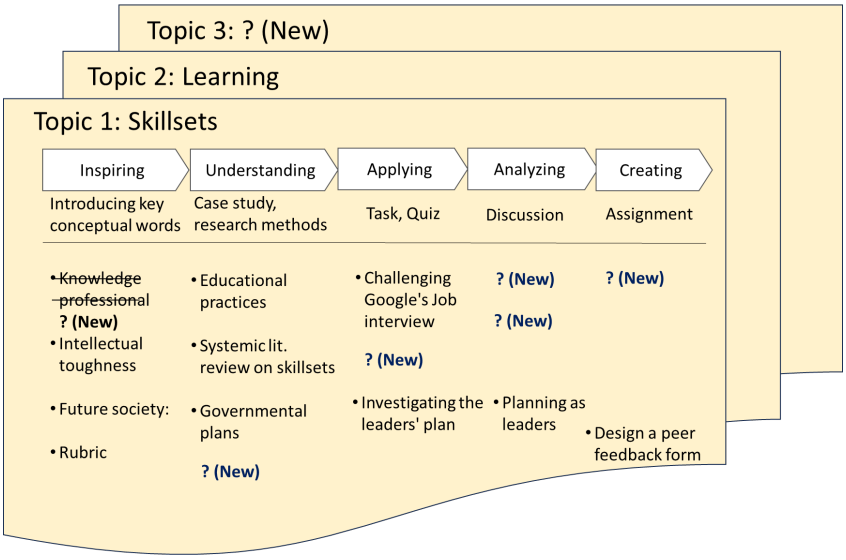
Note: randomly inputted data, to be assessed empirically in our further research

4.6 Step 6: Redesigning by co-creating

As described in the previous section, the six steps explained in this section is not a single closed single cycle; rather, it requires an unceasing open cycle to enhance the quality of learning and education.

The results of analysis obtained in the previous sub-section can give us lessons and clues for redesigning the learning content through open collaboration. To establish an open innovation ecosystem, it is essential to engage industry, government, and civil society in collaborate with learners and educators. We anticipate that redesigned courses, informed by the insights gleaned from this research, will better serve the goal of each educational experience designer (Figure 11). In this phase, we are encouraged to conduct a workshop for further discussion.

Figure 11: An example of redesigned learning content



5. Conclusion

As a conceptual paper proposing a novel approach to developing learning content resources for innovative education, this study elucidates a step-by-step process of learning design rooted in the significant findings of relevant research. This framework enables us to design educational programs by setting clear learning objectives and applying appropriate pedagogical methods to achieve them. Consequently, this study will aid educational designers from theoretical and practical perspectives.

There have been numerous educational global networks such as the Sugar Network of ME310 (Meinel & Leifer, 2021), Design for social innovation and DESIS Network (Meroni et al., 2013), and the Conceiving-Designing-Implementing-Operating (CDIO) Initiative (Berggren et al., 2003), etc.. However, each of them has limitations; for instance, the scope is focused on the engineering or design department, focusing on the output of student projects rather than pedagogical development, strict requirements for participation, etc. Thus, this research suggests building a global open network for collaboration that encourages participation without strict restrictions to expand our knowledge base on pedagogical development.

However, this study has limitations in that it did not collect or analyze empirical data. In our future research, we will analyze empirical data collected in typical educational settings to

assess learners' learning experiences and identify the factors for optimal learning experiences. Additionally, we plan to conduct a series of workshops with collaborators to redesign and co-create the learning resources for innovative education.

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References

Anderson, L. W., Krathwohl, D. R., Airasian, P. W., Cruikshank, K. A., Mayer, R. E., Pintrich, P. R., . . . Wittrock, M. C. (2001). A taxonomy for learning, teaching, and assessing: A revision of Bloom's taxonomy of educational objectives, abridged edition. *White Plains, NY: Longman*.

Berggren, K.-F., Brodeur, D., Crawley, E. F., Ingemarsson, I., Litant, W. T., Malmqvist, J., & Östlund, S. (2003). CDIO: An international initiative for reforming engineering education. *World Transactions on Engineering and Technology Education, 2*(1), 49-52.

Bloom, B. S., & Krathwohl, D. R. (1971). *Taxonomy of Educational Objectives: Volume 2 Affective Domain*: David McKay Company Incorporated.

Csikszentmihalyi, M. (1990). *Flow: The psychology of optimal experience*.

Dubas, J. M., & Toledo, S. A. (2016). Taking higher order thinking seriously: Using Marzano's taxonomy in the economics classroom. *International Review of Economics Education, 21*, 12-20. doi:10.1016/j.iree.2015.10.005.

Fink, L. D. (2007). The power of course design to increase student engagement and learning. *Peer Review, 9*(1), 13-17.

Fink, L. D. (2013). *Creating significant learning experiences: An integrated approach to designing college courses*: John Wiley & Sons.

Johnson, L., Adams Becker, S., Cummins, M., Estrada, V., Freeman, A., & Hall, C. (2016). *NMC Horizon Report: 2016 Higher Education Edition*. Retrieved from Austin, Texas.

Kim, E. (2016). Japanese Policy and Programs for the Fostering of Global Entrepreneurs. *STI Policy Review, 7*(1), 40-65.

Kim, E., & Beuran, R. (2018). *On designing a cybersecurity educational program for higher education.* Paper presented at the Proceedings of the 10th International Conference on Education Technology and Computers.

Kim, E., Luong, T. T., Sun, Q., & Ruma, N. H. (2021). *Topics on creating innovations for graduate students*: Hakueisha.

Kimatu, J. N. (2016). Evolution of strategic interactions from the triple to quad helix innovation models for sustainable development in the era of globalization. *Journal of Innovation and Entrepreneurship, 5*(1), 1-7.

Meinel, C., & Leifer, L. (2021). *Design Thinking Research: Interrogating the Doing*: Springer.

Meroni, A., Fassi, D., & Simeone, G. (2013). Design for Social Innovation as a form of Design Activism: An action format.

Roser, M., & Ortiz-Ospina, E. (2018). Tertiary Education. from Published online at OurWorldInData.org. https://ourworldindata.org/tertiary-education

Sadler, T. D. (2004). Informal reasoning regarding socioscientific issues: A critical review of research. *Journal of Research in Science Teaching: The Official Journal of the National Association for Research in Science Teaching, 41*(5), 513-536.

Souitaris, V., Zerbinati, S., & Al-Laham, A. (2007). Do entrepreneurship programmes raise entrepreneurial intention of science and engineering students? The effect of learning, inspiration and resources. *Journal of Business Venturing, 22*(4), 566-591.