The Innovation Development for Classroom of Students in Educational Field

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Abstract

This study explores the development of innovative classroom media by students enrolled in the course Media and Technology for Education and Learning, a mandatory pedagogy course for Bachelor of Education students. The objectives were to evaluate the effectiveness of student-developed media and reflect on the learning process. The study involved 27 students from one section of the course in semester 1/2024, selected through classified random sampling, students enrolled to the course then picked one group by random sampling. Research instruments included the developed innovations, evaluation forms, and semistructured interview guides. Mean, Stadard Deviation (S.D.) and content analysis were used for data analysis in this research. The study highlights the potential of student-developed media to enhance classroom teaching and learning. The research results in quantitative showed high evaluations for the developed innovations in five aspects: applicability in teaching was very appropriated (Mean = 4.70, S.D. = 0.55), alignment with learning objectives was very appropriated (Mean = 4.66, S.D. = 0.53), cost-effectiveness was appropriated (Mean = 4.31, S.D. = 0.88), innovativeness was appropriated (Mean = 4.23, S.D. = 0.75), and durability was appropriated (Mean = 4.19, S.D. = 0.90). For the research results in qualitative using content analysis of student reflections revealed that the innovations effectively supported achieving learning objectives, while the development process fostered creativity and problem-solving skills.

Keywords: innovation development, education, ADDIE, design thinking



Introduction

The Bachelor of Education (B.Ed.) program in Thailand is designed to prepare students to become professional teachers. This four-year program equips students with the knowledge, skills, and dispositions necessary for a teaching career. The curriculum consists of general education courses, professional education courses, subject-specific (major) courses, and free electives.

The professional education courses include core pedagogy courses that all education students are required to take. These courses cover a wide range of foundational topics, such as curriculum and instruction, writing the lesson plan, educational psychology, media and technology for education and learning, educational measurement and evaluation educational research, and educational internship. These subjects are intended to provide student teachers with essential theoretical, practical knowledge and teaching experiences to effectively teach and manage learning in diverse educational settings.

Media and Technology for Education and Learning is one of mandatory professional education courses for Bachelor of Education students. There are 4 objectives of this course as follow:

- Demonstrates knowledge and understanding of concepts, theories, scope, values, and characteristics of educational media and technology, including digital citizenship, media literacy, copyright infringement, plagiarism, technological changes, and cross-platform technologies.
- Able to ethically analyze problems arising from the use of computers and information technology.
- Able to select and utilize information sources, media, and digital technologies for instructional management and professional tasks.
- Able to design, develop, and evaluate innovation media effectively.

The development of innovative classroom media by students represents one of the highestlevel learning outcomes achievable in teacher education. This task aligns with the Creating level of Bloom's Taxonomy, which reflects the ability of students to synthesize and apply their knowledge in a meaningful way. It demonstrates that student teachers are capable of integrating their theoretical understanding and practical skills to design and develop instructional innovations that enhance teaching and learning.

In this study, aim to evaluate the development of innovative classroom media by students enrolled in the course Media and Technology for Education and Learning, a mandatory professional education course for Bachelor of Education students.

Research Objective

To evaluate the effectiveness of student-developed media and reflect on the learning process.

Literature Review

Innovation Development is one of objectives in the Media and Technology for Education and Learning course. Students have learned about the innovation development through the 2 theories, ADDIE and Design Thinking.

ADDIE: The ADDIE model is one of the most widely used frameworks in instructional design, particularly in the field of education and training.

ADDIE has been using for a long time for instructional design and can also adapt for innovation development. The acronym ADDIE stands for A- Analyze, D - Design, D - Develop, I – Implement and E – Evaluation, representing a systematic and iterative process for creating effective instructional materials and experiences (Molenda, 2003):

- 1. **Analysis** In the analysis phase, it is essential to examine key factors such as learner characteristics, needs assessment of learning, instructional activities, and the available infrastructure. This step provides a foundational understanding that informs the design and development of effective instructional strategies and learning materials.
- 2. **Design** In the design phase, it is necessary to formulate clear learning objectives, instructional strategies, content structure, and plan appropriate instructional media and innovations. This phase also includes the design of assessment methods to evaluate learning outcomes and the effectiveness of instructional materials. The focus is on creating a blueprint for instruction.
- 3. **Development** –In the development phase, information gathered during the analysis and design stages is utilized to create the instructional components. This phase involves the development of content, instructional manuals, media and innovations, learning activities, and instructional procedures. All materials are constructed to align with the defined learning objectives and pedagogical strategies, ensuring coherence and effectiveness in the instructional design. Prototypes are often developed and reviewed during this phase.
- 4. **Implementation** The instructional materials are delivered to the target learners in this phase. The implementation phase involves applying the materials and innovations developed during the previous stage to actual instructional practice. These instructional innovations can be integrated at various parts in the teaching process, including lesson introductions, core instructional activities, or lesson summaries. The goal of this phase is to facilitate effective teaching and enhance student learning through the practical use of the designed materials.
- 5. Evaluation The evaluation phase includes both formative and summative assessment conducted to assess the effectiveness and efficiency of the instructional design. This phase emphasizes the importance of evaluating not only the learning outcomes, but also the learning process and the effectiveness of the instructional media or innovations. Formative evaluation is conducted throughout the instructional design and implementation to provide ongoing feedback, while summative evaluation focuses on measuring the overall success and impact of the innovation in achieving the intended learning objectives. Feedback gathered is used to make necessary revisions.

In teacher education, applying the ADDIE model helps students systematically design educational innovations. It encourages reflective thinking and supports the integration of pedagogical content knowledge with practical instructional strategies.

Design Thinking

Design Thinking, as developed and popularized by the Hasso Plattner Institute of Design at Stanford University (commonly known as d.school), is a human-centered approach to innovation and problem-solving. It emphasizes empathy, collaboration, and iterative experimentation in creating solutions that truly meet users' needs (Brown, 2009; d.school, 2010).

The d.school Design Thinking model consists of five key stages as shown in Figure 1:

- 1. **Empathize** This stage involves understanding the users and their needs through observation, interviews, and engagement. It is the foundation for identifying meaningful problems from the user's perspective.
- 2. **Define** In this phase, insights from the empathy stage are synthesized to clearly define the core problem. A well-defined problem statement helps guide the design process toward user-relevant solutions.
- 3. **Ideate** This is a brainstorming stage, where a wide range of creative ideas and potential solutions are generated without immediate judgment or limitations. The goal is to encourage innovation and divergent thinking.
- 4. **Prototype** Selected ideas are turned into tangible, low-fidelity representations such as models, mock-ups, or simulations. Prototyping helps test concepts quickly and gather feedback.
- 5. **Test** Prototypes are tested with users to evaluate their effectiveness and usability. Feedback collected during testing is used to refine and improve the solution. This often leads to revisiting earlier stages in an iterative cycle.

Figure 1

Stanford d.school Design Thinking Process (Schmarzo, 2017)



Stanford d.school Design Thinking Process

Design Thinking promotes a learner-centered and problem-based learning process, making it particularly relevant in educational contexts. When applied in teacher education, it empowers pre-service teachers to develop innovative instructional materials by deeply understanding learners' needs, generating creative solutions, and refining their ideas based on real feedback.

Samples

Twenty-seven third-year Bachelor of Education students were selected through classified random sampling. The participants were enrolled in the course during the first semester of the 2024 academic year, and one section was randomly selected for inclusion in the study.

Research Instruments

There are three research instruments used in this study:

- 1. The Developed Innovations A total of five innovations were created by students, who were divided into five groups, with each group responsible for developing one innovation.
- 2. Evaluation Forms These consist of five-point rating scale questionnaires assessing the following aspects: innovativeness of the innovation, alignment with learning objectives, applicability in teaching, cost-effectiveness, and durability.
- 3. Semi-Structured Interview Guides These were used to collect qualitative data regarding the process of innovation development.

Statistics

The mean, standard deviation (S.D.), and content analysis were employed for data analysis.

Results

The students were divided into five groups, resulting in the development of five distinct educational innovations. Each group designed an instructional tool aimed at enhancing a specific aspect of English language learning:

- **Group 1** developed an innovation titled "*My Home*", which focused on teaching vocabulary related to household items and their locations within different rooms.
- **Group 2** created an innovation called "*Origami for Prepositions*", where students crafted origami characters and practiced using prepositions by placing them in contextual scenes and narrating short stories.
- **Group 3** designed an innovation named *"Time Flies, Knowledge Stays"*, which taught the concept of time in both British and American formats through the use of a Big Ben-themed interactive display.
- Group 4 developed "The Best Route is the Right Route", aimed at teaching students how to give and understand directions.
- **Group 5** produced an innovation titled *"Tense Mastery Wheel"*, which helped students understand and practice various tenses in English sentences using a visual and interactive wheel mechanism.

Images of these innovations are presented below to illustrate the creativity and instructional design approaches used by each group.

Figure 2 Group 1: My Home



Figure 3 & 4 Group 2: Origami for Preposition



Figure 5





Figure 6 Group 4: The Best Route is the Right Route



Figure 7 & 8 Group 5: Tense Mastery Wheel





The Result of Innovation Evaluation							
		Group 1	Group 2	Group 3	Group 4	Group 5	Overall
Innovativeness	Mean	4.15	4.19	4.33	3.81	4.67	4.23
	S.D.	0.77	0.74	0.70	0.79	0.55	0.75
Alignment with	Mean	4.81	4.63	4.70	4.41	4.74	4.66
learning objectives	S.D.	0.4	0.49	0.47	0.75	0.47	0.53
Applicability in	Mean	4.85	4.85	4.70	4.37	4.74	4.70
teaching	S.D.	0.36	0.36	0.47	0.79	0.53	0.55
Cost-effectiveness	Mean	4.33	4.67	4.33	3.89	4.33	4.31
	S.D.	0.83	0.55	0.83	1.01	1	0.88
Durability	Mean	4.15	4.22	4.48	3.44	4.63	4.19
	S.D.	0.72	0.75	0.70	1.19	0.56	0.90

Table 1

The Result of Innovation Evaluation

From Table 1, the results revealed that:

- **Innovativeness** received an overall mean score of 4.23 (S.D. = 0.75), with Group 5 ٠ achieving the highest score (M = 4.67) and Group 4 the lowest (M = 3.81).
- Alignment with learning objectives showed a high overall mean of 4.66 (S.D. = 0.53), indicating that all innovations were well-aligned with the intended learning goals.
- Applicability in teaching was rated highly, with an overall mean of 4.70 (S.D. = 0.55). Groups 1 and 2 achieved the highest scores (M = 4.85), reflecting strong practical use in classroom settings.
- **Cost-effectiveness** received a moderate overall mean of 4.31 (S.D. = 0.88). Group 2 scored the highest in this area (M = 4.67), while Group 4 received the lowest score (M = 3.89).
- **Durability** had an overall mean score of 4.19 (S.D. = 0.90), with Group 5 again • leading (M = 4.63) and Group 4 scoring the lowest (M = 3.44).

These results suggest that the innovations were generally effective, particularly in terms of applicability and alignment with learning objectives, though there was variation in costeffectiveness and durability across groups.



Figure 9

From Figure 9, the research results in quantitative showed high evaluations for the developed innovations in five aspects: applicability in teaching was very appropriated (Mean = 4.70, S.D. = 0.55), alignment with learning objectives was very appropriated (Mean = 4.66, S.D. = 0.53), cost-effectiveness was appropriated (Mean = 4.31, S.D. = 0.88), innovativeness was appropriated (Mean = 4.23, S.D. = 0.75), and durability was appropriated (Mean = 4.19, S.D. = 0.90). The innovations effectively supported achieving learning objectives, while the development process fostered creativity and problem-solving skills.

Conclusion

Students in the field of education are expected not only to master content knowledge and pedagogical theories but also to develop innovative teaching tools that support the achievement of specific learning objectives. To accomplish this, content, pedagogy, and innovation must be effectively aligned to enhance student learning.

This alignment involves the thoughtful integration of subject matter, instructional strategies, and learners' needs to ensure that innovations are not only accurate in content but also promote meaningful and engaging learning experiences. When pedagogy and content are coherently connected through innovation, the result is a purposeful instructional tool that fosters student engagement, supports knowledge construction, and directly contributes to the achievement of intended educational outcomes (as shown in Figure 10 below).

Figure 10

Key Success Factors in Innovation Development



In conclusion, the development of educational innovations requires students to apply both theoretical knowledge and practical design skills. Utilizing instructional design frameworks such as the ADDIE model and Design Thinking enables students to create innovations that are systematic, learner-centered, and pedagogically effective. Moreover, for an innovation to be considered successful, it must demonstrate a balance of key qualities: innovativeness, alignment with learning objectives, applicability in teaching, cost-effectiveness, and durability. By integrating these elements, students are better equipped to design meaningful innovations that enhance the quality of teaching and learning in real educational settings.

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