The Development of a Conceptual Framework

Thanomporn Laohajaratsang¹, Janejira Arsarkij², and Surasak Maotheuak³
ChiangMai University, Thailand

Abstract
This research aimed to 1) analyze and synthesize teaching competency in the 21st century for teachers conceptual framework and assessment tools. Research methods included the analysis and synthesis of the concept of teaching competency in the 21st century. Nine experts in the relevant fields were requested to assess the standard of evaluation and quality of the 21st century teaching competency conceptual framework and the 21st century teaching competency assessment tools. The research instruments used to collect qualitative and quantitative data were the standard evaluation assessment form and quality assessment form to validate the conceptual framework of the 21st century teaching competency, and the 21st century teaching competency assessment tools which included the self-assessment form, the observation form, and the portfolio assessment form, and interview form. Analysis of the data used in this study included mean, standard deviation and content analysis. The study results of the analysis and synthesis of the 21st century teaching competency framework for teachers evaluated by nine experts, were found to have a very high level of standard evaluation with an average of 4.85 (SD 1.53), and a very high level of the conceptual framework quality, with an average of 4.85 (SD 0.28). In conclusion, the 21st century teaching competency conceptual framework and assessment tools were developed and validated at a very high level of quality and standard evaluation. The experts confirmed that the 21st century teaching competency framework is a practical and comprehensive framework for assessing teaching competency in the 21st century.

Keywords: 21st Century Teaching Competency, Student-Centered, Active Learning, Digital Learning, Authentic Assessment

1. Introduction
Educational management currently affirms teaching and learning that empowers individual students to apply their intelligence for knowledge creation and productivity. The teaching and learning methods that highlight on learning how-to-learn strategies, cooperative learning, and collaborative learning were fostered to be incorporated in classrooms. Furthermore, it aims to create individuals who are proficient in foreign languages and can communicate universally in a time marked by rapid advancements in information and digital technology innovations.
Learners nowadays require aptitudes and knowledge in advanced thinking methods, as well as the development of good character, ethical values, and principles suitable for life in a globalized 21st century society. Thus, instructors must adapt their roles, transitioning from traditional teachers to coaches or facilitators of learning, aligning with the dynamic, technology-driven world (Bureau of Academic and Basic Education Standards, Ministry of Education, 2016). Therefore, it is imperative for instructors to enhance their potential and teaching competencies, adapting to and selecting appropriate teaching and learning approaches, technologies, and innovations. They must also create teaching and learning management methods that resonate with the diverse interests, needs, and learning styles of students in the digital-era (Ministry of Education, 2017). Teachers are also tasked with directing learners through various learning processes, assisting them in achieving their educational goals. Understanding and effectively implementing these practices is crucial for student development.

Teacher competencies in teaching and learning management are vital indicators of effective and efficient education. These competencies include cognitive skills, practical abilities in teaching and learning management, the implementation of diverse teaching strategies, media, teaching and learning resources, and the assessment and evaluation of learning outcomes. Fundamental teaching competencies for the 21st century, as identified by Boonchai (2020), align with Thailand's efforts to develop educational management as defined in the National Education Plan 2017-2036. This plan indicated a strategic framework for lifelong education and learning for all citizens. The Ministry of Education's 2018 National Education Standards (Desired Outcomes of Education: DOE) aim to cultivate learners who are innovative, civic-minded, and possess values such as perseverance, sufficiency, democracy, equality, discipline, diligence, genuineness, and responsibility.

The development of 21st century skills and competencies for teachers, particularly during and after the pandemic, is vital. This not only helps teachers evaluate their proficiency in these competencies but also empowers them to apply their knowledge, abilities, and attitudes effectively in teaching and learning. Enhancing teacher competencies straightforwardly impacts student learning, fostering critical and creative thinking, communication, and collaborative skills (UNESCO IIEP Learning Portal, 2020). These abilities prepare learners to apply their knowledge and abilities for individual and societal benefits.

Given the significance of teachers competency development in 21st century teaching and learning management, this research aimed to analyze and synthesize the 21st century teaching competency conceptual framework and to develop and validate the 21st century teaching competency conceptual framework and assessment tools. By analyzing and synthesizing related documents and research, this study created a practical framework to evaluate the appropriate 21st century teaching competency conceptual framework and tools to assess the 21st century teaching competency for instructors.

1.1 Research Objective

The research objectives for this study were 1) to analyze and synthesize teaching competency in the 21st century for teachers conceptual framework, and 2) to develop and validate the 21st century teaching competency conceptual framework and assessment tools.
2. Literature Review

2.1 21st Century Teaching Competency

The concept of "21st century skills" enveloped a wide range of competencies deemed necessary for students to thrive before beginning on their professional journeys. The Framework for 21st Century Teaching and Learning, developed by the Skills Coalition, defined these skills into three primary areas: Life and Career Skills, Learning and Innovation Skills, and Information, Communication Technology (ICT), Media, and Technology Skills. Central to 21st century education were competencies in study skills and abilities, innovation in knowledge, informational literacy, media and technology fluency, and life and career adaptability (Battelle For Kids, 2019).

The Teachers Council of Thailand's Secretariat, in collaboration with SEAMEO INNOTECH during the 2019 conference, set out to standardize teacher competencies in Southeast Asia to be standard with worldwide benchmarks. Competency was defined as a synthesis of skills, knowledge, behaviors, and attributes that collectively strengthen work performance. The multifaceted nature of teaching required a diverse set of competencies to effectively operate the evolving educational scenery amidst regional integration. These competencies span different dimensions, consisting of in-depth and broad subject matter comprehension, staying informed on educational trends, policies, and curricula, and maintaining awareness of improvements from local to global levels.

A study on Southeast Asian educator competency measures identified 11 critical areas: lesson plan preparation aligned with the school's ethos, integrating a supportive learning environment, improving and applying educational resources, prioritizing skill progression, facilitating the teaching and learning process, establishing ethical and moral values, sustaining students' holistic development, evaluating learner behaviors, employing in ongoing professional development, connecting with stakeholders, and providing comprehensive learner support, including setting evaluative benchmarks. These competencies were integral to shaping young people into competent and well-rounded individuals (SEAMEO INNOTECH, 2019).

The Southeast Asia Teacher Competency Framework, as set forth by the Ministry of Education, identifies core competencies for example, commitment to professional development operation, service quality, self-improvement, teamwork, and adherence to ethical standards. Pragmatic competencies span six domains, including curriculum and teaching and learning management, learner development, classroom management, analytical and research abilities for fostering student growth, leadership, and community collaboration. Instructors play a significant role in facilitating and guiding learners towards revealing their potential, subsequently equipping them with the essential information, knowledge, skills, and attitudes for a fulfilling life.

Laohajaratsang (2014) highlighted the development of the attributes of 21st century teaching competency in the context of teaching and learning management of instructors in Chiang Mai University, identifying four core characteristics for modern teaching: 1) a pedagogical approach that increased student engagement while reducing traditional lecturing (Less Lecture, Learn More Approach); 2) a learner-led, student-centered methodology (Student-Centered/Learner-Led Approach); 3) the integration of ICT in teaching (ICT-Integrated Learning); and 4) assessment that reflects genuine student performance (Authentic Assessment). Each of these attributes represented a vital component of teaching competencies in the 21st century.
1) The Less Lecture, Learn More Approach suggests that traditional lecturing sometimes failed to meet the diverse needs of individual learners. It was not an effective teaching strategy and potentially driving to disengagement and poor learning results. Subsequently, instructors must have ability and skills to become facilitators and coaches to create learning experiences and to oversee learning in a way that foster knowledge construction. This includes arranging and design learning activities, empowering them to associate new information with what they already know. Instructors should transform from traditional roles to facilitators, coaches, and inspirations, arranging and designing learning experiences, preparing learning resources, and integrating different activities to enhance students’ interest and promote analytical and critical thinking cultivating collaboration and real-world pertinence.

2) The Student-Centered/Learner-Led Approach is based on three principles: recognizing individual differences, believing in each student's capacity to learn, and understanding that learning could occur anytime, anywhere. This approach motivates students to participate actively in their own learning process, allowing them to select content of their interests, and apply knowledge effectively in their contexts. Additionally, it encourages student involvement in learning practice over passive reception to active engagement physically, intellectually, socially, and sincerely.

3) The use of ICT in teaching supports learner-centered instructional approaches by enabling students to access content without time or place restrictions, and providing platforms for interaction and trade of thoughts with others. The choice of topics for ICT-enhanced instruction should be appropriate to complement teaching strategies, supporting more viable instruction, which required thoughtful design integrates different factors and considerations.

4) Authentic Assessment aligns with teaching and learning strategies focusing on grading participation in class discussions through different activities (online and offline), and the assessment that based on activities or projects conducted. This modern approach enhances students to learn in five ways: engagement with the material, inspiration to learn, behavior as dynamic learners, a positive attitude towards modern learning procedures, and accomplishment of a real-world standards. This also affected instructors in two significant ways: cultivating a positive attitude towards modern learning management and instructing behaviors that emphasize student-centered practices, utilize ICT effectively, and implement authentic assessment methods.

Through analysis and synthesis of various principles and concepts, a conceptual framework for 21st century teaching competency has been developed, comprising four main pillars: Student-Centered Learning, Active Learning, Digital Learning, and Authentic Assessment.

2.2 21st Century Teaching Competency Assessment Tools

In the 2013 report of the Asia Society introduced a symptomatic instrument designed to measure competencies essential for the 21st century as indicated in the Global Cities Education Network Report. This instrument assessed such competencies across three distinct dimensions: cognitive, which includes knowledge-centric capabilities; interpersonal, covering skills in human interactions; and intrapersonal, related to the individual's personal abilities. The suite of evaluation tools featured various methodologies: evaluative tests on knowledge, self-report instruments, compilation of portfolios, evaluations of task and assignments, computerized exams with predetermined answers, and assessments featuring open-ended questions.

Furthermore, the Organization for Economic Co-operation and Development (OECD) in 2020, formulated the Teacher Knowledge Survey (TKS) Assessment Framework, a
conceptual schema aimed to cultivate the competencies of educational professionals (Herppich et al., 2018).

The evaluation of teachers’ competencies utilized a comprehensive set of instruments, including tools for assessing general knowledge, reports detailing learning and pedagogical improvement opportunities, self-assessment with related to motivational and emotional aspects of teaching, and assessments of educational performance.

Within the realm of instruction, a variety of tools were utilized to assess teaching competency. These tools incorporated grading rubrics, Canvas Assignments, plagiarism detection software, self-assessment and peer evaluation methods, surveys, and classroom surveying. Assessment tools such as evaluation rubrics, assignments through Canvas, tools for detecting plagiarism, both self-assessment and peer evaluations, questionnaires, and interactive class surveys were included (Cornell University, 2023). Particularly in California, the assessment framework was structured to promote consistent reliability and fairness throughout the state, utilizing teaching-related appraisal tasks and rubrics to maintain a uniform standard for assessing teaching competence (California Commission on Teacher Credentialing, 2023). Instruments for self-assessment were particularly vital, enabling instructors to reflect and evaluate their teaching methods, objectives, and achievements, with the Teaching Practices Inventory serving as one notable tool (Wieman and Gilbert, 2017) (University Center for Teaching and Learning, University of Pittsburgh n.d.).

Furthermore, for those teaching counselling, the Teaching Competencies Scale (TCS) was developed using assessments that were statistically reliable to ensure accurate evaluation. It was recommended that the capacity for appraisal should be distinctly isolated from other teaching abilities, such as the capacity to instruct, to surrender a more focused and effective assessment process (Swank et al, 2021).

In 2020, a research study in Thailand by Angnoi and Konphuang conceptualized a modern framework for nurturing instructor competencies in the 21st century. This framework was propelled by the paradigm of schools as learning organizations and outlined a systematic five-stage development procedure, commencing with a needs assessment and concluding with the assessment of development results.

The innovative competency framework for 21st century began with two main strategies. The initial step involved the formulation of a preliminary draft highlighted on empirical information gathered from needs assessments and interview reports. Subsequently, the second step was an approval stage incorporated expert recommendation, utilizing a model appropriate checklist and comprehensive content analysis.

From the diverse studies, these instruments provided an intensive framework for evaluating teaching competency, ensuring that educators adhere to essential standards and possess the devices to support effective teaching and learning. The methodologies for evaluating 21st century teaching competencies were multifaceted, including self-assessment, observational form, interview techniques, and portfolio assessments.

3. Methodology

In order to scaffold and validate the 21st century teaching competency conceptual framework in this research, the Successive Approximation Model (SAM) instructional design process (Allen, 2012) was implemented as a part of process in the research methodology. SAM comprised of three phases: preparation, iterative design, and iterative development.
1) Preparation: The initiation of this research involved the collection of information through various literature reviews to determine theories, concepts, and prior studies related to the Conceptual Framework of 21st Century Teaching Competencies. This process included the examination of teaching competency performance indicators and challenges within the teaching profession. Validation was completed through the appraisal forms and interviews with nine experts and ten distinguished and recognized teachers. Moreover, the 'Savvy Start' framework was implemented during interviews with experts on the 21st Century Teaching Competency framework. Subsequently, the assembled data were meticulously analyzed and synthesized in preparation for the design phase.

2) Iterative Design: The advancement of the design began with the creation of a prototype for the 21st century teaching competency framework, utilizing insights data from relevant theoretical literature reviews and gathered information on the 21st century teaching competency concept. The prototype was refined with input from the 'Savvy Start' discussion, laying the foundation for the 21st century teaching competency framework in order to be tailored to the 21st century teaching competency assessment instruments. In conjunction, instruments for the evaluation were methodically designed and planned to facilitate the appraisal of this 21st century teaching competency.

3) Iterative Development: Expert evaluations were significant in this stage. The conceptual framework for the 21st century teaching competency was evaluated by a board of nine experts, which included the specialists in the area of teaching and learning, instructional experts in educational technology, and experts in curriculum and instruction. To evaluate and to confirm the validity of the conceptual framework, these experts utilized a five-point Likert scale, ranging from 'strongly agree/excellent/very appropriate' (5 points) to 'strongly disagree/very poor/very inappropriate' (1 point). The assessment highlighted several criteria: standards of evaluation to validate the quality of the 21st century teaching competency conceptual framework, and the assessment of the 21st century teaching competency assessment tools. Experts were also encouraged to provide their insights and recommendations regarding the 21st century teaching competency framework.

3.1 Research Instruments

The research team developed research instruments based on an analysis and synthesis of relevant theoretical reviews and documents. The following instruments were drafted: 1) the standard evaluation form for the 21st century teaching competency conceptual framework and tools. This evaluation from consisted of five main measures developed by the Joint Committee on Standard Education (2020), namely, feasibility standards, propriety standards, accuracy standards, and evaluation accountability standards. 2) Quality appraisal form for the quality of the 21st century teaching competency to validate the appropriateness and the relevance of details in the framework and assessment tools with respect to the developed 21st century teaching competency conceptual framework.

To confirm validity and reliability, the research team subjected these instruments to expert assessment. This included assessing content consistency (IOC) and checking content validity to ensure alignment with the defined objectives. A minimum of three experts were participated in this process to confirm the consistency of each item with its intended measurement purpose. Items were rated on a scale from +1 (confidently aligns with the objective) to -1 (confidently does not align with the objective). An IOC scores were calculated as the sum of scores divided by the total number of experts. Items with an IOC scores between 0.5-1.00 were selected, while those with an IOC scores lower than 0.5 were considered for revision or removal. A pilot test with 20 teachers was conducted to affirm
reliability using Cronbach's Alpha coefficient method. This method appraised the internal consistency of the tools, including the rating scale and self-assessment forms. An alpha coefficient of at least 0.70 was considered indicative of a reliable research instrument.

### 3.2 Method of Data Collection

The methodological approach to assessing 21st century teaching competencies framework included a comprehensive synthesis of documents relevant to the topic. This was followed by a precise assessment conducted by nine experts from the relevant fields. To assess the 21st century teaching competency framework effectively, several instruments were utilized. These included the standard of evaluation form, and a quality assessment form particularly customized for the 21st century teaching competency framework assessment, certifying a detailed examination comprised its standards. Moreover, an evaluation forms were implemented to determine the appropriateness of the framework in the context of contemporary instructional needs. To obtain deeper insights, interviews were conducted with experts, for which a customized interview form which was developed to apprehend the distinction of their expertise on the 21st century teaching competency concept. These combined strategies provided a multifaceted assessment of the framework's relevance and effectiveness in sustaining the requirement for 21st century teaching competency conceptual framework evaluation.

### 4. Results and Discussion

#### 4.1 Research Results

The research findings are displayed into two parts regarding research objectives.

Part 1: The improvement of 21st century teaching competency conceptual framework started from the rigorous analysis and synthesis of various instructional principles, theories and concepts. This framework was designed and developed based on four fundamental pillars: Student-Centered Learning, Active Learning, Digital Learning, and Authentic Assessment.

1) Student-Centered Learning:

1.1 Design Lesson Plans with Less lecture & Learn More (SCL): This criterion of the framework advocates for lesson plans that minimize traditional lectures style, instead enhancing a learner-centric environment where learners engage more actively in their own learning practice, promoting self-generated knowledge.

1.2 Student-Centered with Personalized Learning (SCP): This guideline emphasizes customizing learning experiences to individual students' abilities, needs, and interests, thereby projecting each learner's potential.

1.3 Student-Centered with Autonomous Learning (SCA): This approach highlights on enabling students to become independent learners, empowering them to pursue knowledge actively and c lifelong learning behavior.

2) Active Learning:

2.1 Activity-Based Learning with High Order Thinking (ALH): Teaching and learning activities designed under this pillar require students to be at the center of the teaching and learning process, obligating in analytical, synthetic, and critical thinking, as well as creativity and systematic problem-solving, thus employing what they learn to a new context.

2.2 Design Learning Activities Connecting to Real World Activities (ALR): This comprises providing learning experiences that reflect real-world phenomena, allowing learners to
connect academic knowledge with their individual experiences and apply what they learn to practical circumstances.

2.3 Integrated & Multidisciplinary Learning (ALI): This approach stimulates the integration of knowledge within the similar area of learning practice and across different disciplines, empowering students to apply various knowledge practices and skills concepts.

3) Digital Learning:

3.1 Use a Wide Variety of Digital Learning Tools (DLUs): This includes integrating a diverse range of digital tools into the implementation of teaching materials and activities, as well as evaluations, to enhance technology-rich learning environments.

3.2 Technology-Enhanced Learning (DLE): This underlines on utilizing digital technology to facilitate effective learning, equipping students with crucial 21st century skills through digital learning modalities.

3.3 Design Innovative Learning with Digital Tools (DLI): This encourages the design of teaching and learning innovations and assessments utilizing digital tools, in collaboration with learners to promote their digital literacy and learning autonomy.

4) Authentic Assessment:

4.1 Use a Wide Variety of Assessment Tools (AAU): This aspect advocates the use of diverse authentic assessment tools and techniques that are paralleled with the defined learning outcomes, assuring accurate and relevant assessments.

4.2 Authentic and Outcome-based assessment (AAO): This emphasizes on evaluations that are grounded in real-world practice and aimed at assessing learning outcomes, with the analysis of outcomes utilized to indicate and improve individual student development.

4.3 Design Innovative Assessment Approach with Students (AAI): This encourages the collaborative design of innovative assessment methods and tools with students, engaging learners in the assessment process and allowing for periodic appraisals that are integral to their learning journey.

The 21st century teaching competency conceptual framework is illustrated in figure 1.
Moreover, the 21st century teaching competency assessment tools was formed and developed regarding the 21st century teaching competency conceptual framework. The assessment tools were started from the rigorous analysis and synthesis of various educational principles, theories and concepts of the 21st century teaching competency. The 21st century teaching competency appraisal tools were multifaceted and validated, comprising self-assessment, observational form, interview form, and portfolio assessments form.

Part 2: The evaluation results, as appraised by nine experts specialized the relevant areas consisting teaching competency, curriculum and instruction, digital technology for learning, and authentic assessment. The results of the standard evaluation are revealed in Table 1. The results of the 21st century teaching competency conceptual frameworks quality assessment are displayed in Table 2.

Table 1: Results of standard evaluation (Joint Committee on Standard for Education Evaluation, 2020)

<table>
<thead>
<tr>
<th>Areas of assessment</th>
<th>Mean</th>
<th>S.D.</th>
<th>Quality Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Utility Standards</td>
<td>4.78</td>
<td>0.42</td>
<td>Very high</td>
</tr>
<tr>
<td>Feasibility Standards</td>
<td>4.84</td>
<td>0.23</td>
<td>Very high</td>
</tr>
<tr>
<td>Propriety Standards</td>
<td>4.89</td>
<td>0.22</td>
<td>Very high</td>
</tr>
<tr>
<td>Accuracy Standards</td>
<td>4.89</td>
<td>0.26</td>
<td>Very high</td>
</tr>
<tr>
<td>Evaluation Accountability Standards</td>
<td>4.79</td>
<td>0.40</td>
<td>Very high</td>
</tr>
<tr>
<td>Overall</td>
<td>4.85</td>
<td>1.53</td>
<td>Very high</td>
</tr>
</tbody>
</table>

The detailing of the analysis and synthesis of the conceptual framework for 21st century teaching competencies for instructors revealed that the quality assessment of this framework comprised of five standards developed by the Joint Committee on Standard Education (2020). The overall quality of the 21st century teaching competency framework was revealed to be at the very high level with an average score of 4.85. The scores were tied for Propriety Standards and Accuracy Standards, each with an average value of 4.89, followed by Feasibility Standards at 4.84, Evaluation Accountability Standards at 4.79, and Utility Standards at 4.78, implying that every aspect of standard was evaluated at the very high level.
The appraisal of the quality of the 21st century teaching competency framework, which consisted of four significant pillars, pointed that the overall quality of the 21st century teaching competency framework was at the very high level, with an average score of 4.85. The quality levels of the 21st century teaching competency framework in descending order were as follows: Digital Learning with the highest average score of 4.93, followed by Student-Centered Learning and Active Learning, both attaining an average of 4.85, displaying the very high level of suitability, and Authentic Assessment with an average score of 4.78, also evaluated at the very high level of quality.

4.2 Discussion

From the research results, the results of the appraisal from the experts could be discussed as follows. The SAM instructional design process was implemented in this study in order to form the 21st century teaching competency conceptual framework which was the principles to create the 21st century teaching competency assessment tools.

The experts underlined that the framework was of excellent quality and excessively beneficial for improving the teaching competencies of instructors in the 21st century. It was particularly effective in promoting instructors’ classroom management competencies, directed by the standards of the 21st century teaching competency framework which related to a study of OECD (2108) that revealed the future of education and a research conducted by Almazroa et al., (2023) on teaching 21st century skills to shape proactive teachers.

In the domain of Student-Centered, experts suggested the design of learner-centric instructive activities that encourage learners to participate in activities that were challenging and cater to their personal interests, capabilities, and knowledge bases. This could align with a research conducted by Stehle, S.M. and Peters-Burton in 2019 that highlighted the significance of maximizing student participation in the teaching and learning process to enhance independent learning. Nevertheless, the experts also implied about traditional lecturing style still remained essential and should be complemented by activities that encourage active student engagement.

Regarding Active Learning, the experts supported for the implementation of teaching and learning activities that stimulate higher-order thinking. This was consistent with research study of Surakarn et al., (2020) and a study of Sukjaroen and Chobphon (2021) that emphasized that active learning was a crucial teaching and learning method that enhance higher order thinking skills. Instructors should regularly create questions that provoke critical thinking and assure that learning experiences were connected to real-world contexts. They emphasized the significance of embedding Active Learning in all subject areas and paralleled learning experiences with curriculum standards and indicators.

As for Digital Learning, the experts stated that digital technology competence was essential for modern instructors to enhance teaching and learning which related to a report of OECD (2018) mentioning the importance of digital learning skills in the future of education. However, the individual digital competency of each teacher, particularly in relation to planning teaching and learning activities, solving problems, or improving learning quality.

<table>
<thead>
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<tbody>
<tr>
<td>Student-Centered</td>
<td>4.85</td>
<td>0.35</td>
<td>Very high</td>
</tr>
<tr>
<td>Active Learning</td>
<td>4.85</td>
<td>0.35</td>
<td>Very high</td>
</tr>
<tr>
<td>Digital Learning</td>
<td>4.93</td>
<td>0.14</td>
<td>Very high</td>
</tr>
<tr>
<td>Authentic Assessment</td>
<td>4.78</td>
<td>0.63</td>
<td>Very high</td>
</tr>
<tr>
<td>Overall</td>
<td>4.85</td>
<td>0.28</td>
<td>Very high</td>
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utilizing digital tools, must be considered. This included accounting for the availability of technological resources to each institute and the potential advantages to learners. Additionally, the development of quality of digital technology devices was vital for the efficacy of teaching and learning activities.

In the area of Authentic Assessment, experts suggested giving priority to real-world assessment strategies using a variety of suitable tools which similar to a research of DiCerbo K. (2020). Assessments should be designed to shape and improve learner learning outcomes, with learners actively engaging in the design process alongside their teachers. It was beneficial for learners to understand their own capabilities and to apply this knowledge for self-development.

5. Conclusion

The purposes of this research aimed to develop and to validate the 21st century teaching competency conceptual framework and the 21st century teaching competency assessment tools. The methodology of this research implemented the processes of the SAM instructional design process comprised three phases: preparation, iterative design, and iterative development. Nine experts were assigned to evaluate the 21st century teaching competency conceptual framework and the 21st century teaching competency assessment tools. The findings revealed that the experts agreed that the 21st century teaching competency framework and the assessment tools illustrating very high levels of standard evaluation and quality assessment. The experts’ recommendation for development consisted of adding more rubric details to clarify the differences of each of the items in the 21st century teaching competency assessment tools.

6. Suggestions

Future research could emphasize on the empirical validation of the 21st century teaching competency framework’s four fundamental pillars; Student-Centered, Active Learning, Digital Learning, and Authentic Assessment. Such research should target to measure the impact of these competencies on student learning outcomes, comprising academic achievement, learning engagement, and preparedness for the working. Longitudinal research could track the development of these competencies in instructors and their maintained influence on teaching and learning practices. Further studies could also focus on the integration of this framework across various educational settings and curricula, assessing its flexibility and adaptability to diverse teaching and learning environments and cultural contexts.

Suggestion for applying the framework and the assessment tools, to implement the 21st century teaching competency framework effectively as assessment tools, educational institutions should first assure that instructors were well-versed with each pillar's theoretical supporting and practical implementation. Professional development workshops could be designed to familiarize instructors with assessment strategies that align with each competency aspect. For example, for the Student-Centered pillar, instructors could be trained to create portfolios that document learner choice and voice in teaching and learning activities. Similarly, for Active Learning, instructors could develop rubrics that assess learners’ engagement in problem-solving and critical thinking activities.

In terms of Digital Learning, instructors could employ technology-based evaluations that estimate students' proficiency in utilizing digital tools for learning and communication. Lastly, Authentic Assessment would require the comprehension and development of
performance-based tasks that enhance real-world challenges and implementation of knowledge. Assessment tools should be active, allowing for iterative reflection and continuous development. By embedding these tools within the curriculum, instructors could regularly evaluate and define their instructional methods, thereby fostering an environment that maintain the competencies significance for achievement in the 21st century.

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