International Journal of Evaluation and Research in Education (IJERE)
Vol. 15, No. 6, December 2026, pp. 5052~5061
ISSN: 2252-8822, DOI: 10.11591/ijere.v15i6.39751

Development and validation of a media design and production competency model for media design students

Sirinrudee Yossothorn, Prapassorn Wongdee
Department of Educational Communications and Technology, Faculty of Industrial Education and Technology, King Mongkut's University of Technology Thonburi (KMUTT), Bangkok, Thailand

Article Info

Article history:

Received Mar 31, 2026
Revised Aug 7, 2026
Accepted Oct 25, 2026

Keywords:

Competency model
Confirmatory factor analysis
Exploratory factor analysis
Instrument development
Media design and production competency

ABSTRACT

This study aimed to develop and validate a competency model for media design and production among undergraduate students in media design and production-related programs. An instrument development and validation research design was employed with 310 students from higher education institutions in Bangkok, Thailand. The competency assessment instrument was developed from relevant theories and literature, evaluated for content validity by experts, and validated using exploratory factor analysis (EFA) and confirmatory factor analysis (CFA). The findings identified five competency components: problem identification ability (PIA), design planning ability (DPA), prototyping ability (PA), implementation ability (IA), and evaluation ability (EA), which explained 73.39% of the total variance and demonstrated satisfactory construct validity and model fit. Unlike existing approaches that assess competencies separately, the proposed model integrates competencies across the media design and production process and provides a systematic framework for competency assessment. The validated model provides a framework for student self-assessment, supports formative assessment, meaningful feedback, and feed-forward practices, and facilitates instructional improvement through the alignment of assessment practices, instructional design, and quality assurance processes with professional standards and industry expectations.

This is an open access article under the CC BY-SA license.

Corresponding Author:

Prapassorn Wongdee
Department of Educational Communications and Technology, Faculty of Industrial Education and Technology, King Mongkut's University of Technology Thonburi (KMUTT)
126 Pracha Uthit Road, Bang Mod, Thung Khru, Bangkok 10140, Thailand
Email: prapassorn.won@mail.kmutt.ac.th

1. INTRODUCTION

The rapid growth of the digital media industry and creative economy has transformed the competencies required of graduates entering media-related professions. As digital technologies continue to reshape communication, content creation, and media production, higher education institutions are increasingly expected to equip students with competencies that enable them to design, develop, implement, and evaluate media products in authentic professional contexts [1]. Consequently, competency-based education has become an important approach for aligning educational outcomes with industry expectations and workforce demands. Recent studies have emphasized the importance of competency-oriented assessment and learning tasks that allow students to demonstrate their abilities through digital media production [2]–[4]. Therefore, a clearly defined competency framework is essential for preparing graduates for professional practice in the creative media industry.

In media design and production programs, students are expected to engage in authentic learning experiences that involve problem identification, design planning, media development, implementation, and evaluation [5]. These competencies require the integration of technical skills, creative thinking, and problem-solving in digital media production [3], alongside collaboration and reflective practice. Accordingly, competency assessment plays an important role in ensuring alignment among learning outcomes, instructional activities, and curriculum objectives [2].

However, competency assessment in many higher education institutions continues to rely on instructor judgment and locally developed criteria, resulting in inconsistencies across courses and institutions [6], [7]. Such practices may reduce assessment reliability and transparency and limit the alignment of curricula with professional competency standards [8], [9]. Furthermore, assessments that focus primarily on final products or technical skills often fail to capture the process-oriented competencies required throughout media design and production.

Although previous studies have developed instruments for assessing digital competence, media literacy, and technology-related skills, most focus on general digital capabilities or isolated technical competencies rather than the complete media design and production process [10]–[13]. Consequently, competencies related to problem identification, design planning, prototyping, implementation, and evaluation remain insufficiently represented. This gap highlights the need for a comprehensive and empirically validated competency assessment framework to support competency-based education and curriculum development in media design and production programs. To provide a clearer understanding of existing research, previous studies related to digital literacy, media production, and instructional media development were reviewed and synthesized according to their focus, findings, and limitations. The results are presented in Table 1.

Table 1. Synthesis of previous studies on media design and production competency assessment

Study	Focus	Main findings	Limitations related to the present study
[14]	Media literacy and creative video production	Media and information literacy supports creative video production outcomes	Focused on outcomes, not full competency process
[15]	Digital media competencies in teacher education	Identified digital media-related competencies for preservice teachers	Did not address full media production lifecycle
[16]	Instructional media development	Proposed systematic media production processes	Lacked validated competency assessment model
[17]	Digital literacy assessment tools	Reviewed teacher digital literacy instruments	Focused on literacy, not production competency
[18]	Digital competency framework	Defined teacher digital competency structure	Not specific to media production processes
[19]	Digital competence scale (SDiCoS)	Developed validated student digital competence scale	Focused on general digital competence
[20]	Digital competency instrument	Validated competency instrument across education levels	Did not include authentic media production tasks
[21]	Digital skills measurement	Developed workplace digital skills scale	Focused on workplace context, not education

As shown in Table 1 , previous studies have mainly examined digital literacy, media literacy, technology integration, and specific technical skills. However, limited research has provided a comprehensive framework for assessing competencies across the entire media design and production process. Existing assessment approaches often emphasize isolated competencies and rely on non-standardized criteria, creating challenges for consistent evaluation and curriculum alignment with industry needs. This gap highlights the need for a validated competency framework tailored to media design and production education.

To address this need, the present study integrates the analysis, design, development, implementation, and evaluation (ADDIE) instructional design model and the 3P framework (pre-production, production, and post-production) to conceptualize media design and production competency as a process-oriented construct [2], [22], [23]. The proposed model comprises five dimensions: problem identification ability (PIA), design planning ability (DPA), prototyping ability (PA), implementation ability (IA), and evaluation ability (EA), representing key stages of professional media production [24].

The novelty of this study lies in the integration of the ADDIE model and the 3P framework into a unified competency assessment model validated through both exploratory factor analysis (EFA) and confirmatory factor analysis (CFA). Theoretically, the study extends competency assessment literature by linking instructional design and media production processes within a single framework. Practically, the findings provide a structured approach for competency assessment, curriculum improvement, and the development of authentic learning experiences in media design and production programs. Accordingly, this study addressed the following research questions:

- What dimensions constitute the competency of media design and production among students in media design and production programs?
- Does the proposed competency model demonstrate a good fit with the empirical data?

2. METHOD

2.1. Research design

This study employed an instrument development and validation design [25] to develop and validate a competency assessment framework for media design and production. The study was conducted in three phases: i) development of the theoretical framework through literature review and synthesis; ii) instrument development, content validation, pilot testing, and item analysis; and iii) instrument validation using EFA and CFA. The framework comprised five competency dimensions: PIA, DPA, PA, IA, and EA.

2.2. Population and sample

The participants were 310 undergraduate students enrolled in media design and production-related programs at higher education institutions in Bangkok, Thailand. Purposive sampling was employed to recruit students who had completed coursework or practical learning experiences related to media design and production, ensuring their familiarity with the competencies under investigation [25]–[27]. The sample size exceeded recommended thresholds for factor analysis and structural equation modeling. Hair *et al.* [25] suggested that samples larger than 200 are adequate for factor analysis, while Comrey and Lee [28] classified a sample size of 300 as good. Thus, the sample was considered sufficient for both EFA and CFA.

2.3. Theoretical framework: integration of the ADDIE model and the 3P framework

The competency framework was developed by integrating the ADDIE instructional design model with the 3P framework (pre-production, production, and post-production). The ADDIE model consists of five phases: analysis, design, development, implementation, and evaluation [2], whereas the 3P framework represents the major stages of media production. Within the integrated framework, the pre-production stage corresponds to analysis and design, the production stage corresponds to development, and the post-production stage corresponds to implementation and evaluation. Based on this structure, PIA and DPA were aligned with pre-production, PA with production, and IA and EA with post-production. The alignment among the competency dimensions, the ADDIE model, the 3P framework, and their theoretical foundations is presented in Table 2.

Table 2. Integration of the ADDIE model, the 3P framework, and the theoretical foundations of the competency dimensions

Competency dimension	Description	ADDIE model	3P framework	Theoretical basis/supporting literature
PIA	Ability to analyze problems, needs, and context to define objectives for media development [22], [24], [29]	Analysis	Pre-production	Problem-solving theory [29]
DPA	Ability to design structure, plan content, and define media strategies [22], [24], [30]	Design	Pre-production	Design thinking [30]
PA	Ability to develop functional media prototypes and refine design solutions [22], [31], [32]	Development	Production	Design-based learning [31]
IA	Ability to apply media in authentic learning or professional contexts [5], [22], [33]	Implementation	Post-production	Authentic learning theory [33]
EA	Ability to evaluate media effectiveness and improve outcomes through reflection [2], [6], [7], [34]	Evaluation	Post-production	Reflective practice [34]

2.4. Instrument development

Based on the integrated competency framework, 35 questionnaire items were initially developed to measure the five competency dimensions. The instrument employed a five-point Likert scale ranging from 1 (very low) to 5 (very high) to assess students' competency levels [35].

2.5. Content validation, pilot testing, and item analysis

The initial instrument was evaluated by three experts in educational measurement, instructional design, and media production. All items achieved item-objective congruence (IOC) values of 0.67 or higher, indicating acceptable content validity [36]. The questionnaire was then pilot tested with 30 undergraduate students who were not included in the main study. Based on the recommended item discrimination criterion

of 0.30 [37], six items were removed, resulting in a final instrument of 29 items. Reliability analysis indicated high internal consistency, with Cronbach's alpha coefficients ranging from .96 to .98 across the competency dimensions and .97 for the overall instrument. The final questionnaire structure is presented in Table 3.

Table 3. Details of the questionnaire items

Indicators	Definition	Item No.	Question items	Number of items
PIA	The PIA refers to the capability to analyze needs, identify problems, and understand contextual factors prior to media design and development [22], [24], [29], [38].	1.1	I am able to use diverse information gathered from various sources to define objectives for media or activity design.	4
		1.2	I am able to clearly identify the objectives of media or activity design in a way that can be effectively implemented.	
		1.3	I am able to accurately and comprehensively identify the procedures for designing media or activities and carry them out in practice.	
		1.4	I am able to accurately and comprehensively identify the procedures for developing media or activities and implement them accordingly.	
DPA	The DPA refers to the ability to structure content, define learning or communication objectives, and develop systematic media design strategies [22], [24], [30], [39].	2.1	I am able to plan the design of media or activities accurately in accordance with principles and cover all essential components of a planning process.	4
		2.2	I am able to plan media or activity design that aligns with the key characteristics of the target audience.	
		2.3	I am able to plan media or activity design that responds to the actual needs of the target audience.	
		2.4	I am able to plan the budget for designing media or activities to achieve the intended outcomes.	
PA	The PA refers to the ability to transform design concepts into functional media products through iterative development and refinement [22], [31], [33], [40].	3.1	I am able to carry out the prototype development process systematically, from planning to producing a completed work.	7
		3.2	I am able to prepare appropriate equipment for media or activity production to successfully achieve the objectives.	
		3.3	I am able to select the type of media or activity that aligns with the core content to be produced.	
		3.4	I am able to design and organize graphic elements in alignment with the content.	
		3.5	I am able to design and organize graphic elements in alignment with the characteristics of the target audience.	
		3.6	I am able to record and select audio that is consistent with the content.	
		3.7	I am able to record and select audio that is consistent with the characteristics of the target audience.	
IA	The IA refers to the ability to deploy media products in authentic learning or professional environments [5], [22], [33], [40].	4.1	I am able to evaluate the developed prototype of media or activities.	4
		4.2	I am able to apply the prototype of media or activities in different contexts.	
		4.3	I am able to apply the developed media or activities to meet the needs of the target audience.	
		4.4	I am able to apply the prototype of media or activities to solve immediate problems in real-life situations.	
EA	The EA refers to the ability to assess media effectiveness, user experience, and process quality in order to improve future development [2], [6], [7], [34], [41].	5.1	I am able to collect data on the effectiveness of media or activities after pilot implementation in accordance with established principles.	10
		5.2	I am able to use information obtained from pilot implementation to revise and improve the media or activities before actual use.	
		5.3	I am able to analyze the strengths and areas for improvement of the media or activities after implementation.	
		5.4	I am able to summarize the analysis results and make necessary revisions (if improvements are needed) for future development.	
		5.5	I am able to analyze the impact of the media or activities on the target audience.	
		5.6	I am able to propose evaluation methods or instruments for media or activities that align with the stated objectives and adhere to established principles.	
		5.7	I am able to evaluate media or activities using appropriate methods or instruments to accurately address the stated questions or objectives.	
		5.8	I am able to summarize the results of media or activity development in accordance with the evaluation findings.	
		5.9	I am able to discuss the results of media or activity development by reasonably and credibly explaining the factors leading to the outcomes.	
		5.10	I am able to propose feasible guidelines for further development of media or activities and contribute to the advancement of knowledge in the field of media or activity production.	

2.6. Construct validity and reliability

Construct validity was evaluated using EFA and CFA. Prior to EFA, the Kaiser–Meyer–Olkin (KMO) measure and Bartlett's test of sphericity were conducted to assess data suitability for factor analysis [42]. EFA was performed using principal axis factoring with Promax rotation, and items with factor loadings of .50 or higher were retained [25], [43], [44].

CFA was subsequently conducted within the structural equation modeling (SEM) framework. Convergent validity was assessed using standardized factor loadings (≥.50), average variance extracted ((AVE)≥.50), and composite reliability ((CR≥.70), while discriminant validity was evaluated using the Fornell–Larcker criterion [45], [46]. Model fit was examined using χ^2/df, goodness-of-fit index (GFI), adjusted goodness-of-fit index (AGFI), comparative fit index (CFI), Tucker–Lewis index (TLI), and root mean square error of approximation (RMSEA) according to recommended criteria [47]. Reliability was assessed using CR and Cronbach's alpha coefficients, with values of .70 or higher considered acceptable [44].

2.7. Data collection

Following ethical approval, data were collected from undergraduate students enrolled in media design and production-related programs at selected higher education institutions in Bangkok, Thailand. Eligible students were invited to complete an anonymous online questionnaire voluntarily. Participants were informed of the study objectives, confidentiality procedures, and their right to withdraw at any time. Data collection was conducted between May and October 2025.

2.8. Confounding variables

To minimize potential confounding effects, all participants met the same inclusion criteria and completed the same online questionnaire during the same academic period under standardized administration procedures.

2.9. Data analysis

Data were analyzed using International Business Machines (IBM) statistical package for the social sciences (SPSS) statistics and IBM SPSS analysis of moment structures (AMOS). Descriptive statistics were used to summarize participant characteristics, EFA was performed using SPSS Statistics, and CFA was conducted using AMOS. Statistical significance was set at .05.

3. RESULTS AND DISCUSSION

3.1. Results of the development of the media design and production competency model

The EFA was conducted to examine the factor structure of the proposed competency assessment instrument. Bartlett's test of sphericity was significant (χ^2=10594.77, df=406, p<.001), confirming the suitability of the data for factor analysis. The KMO measure was 0.94, and all measure of sampling adequacy (MSA) values exceeded 0.50. Five factors were extracted, accounting for 73.39% of the total variance, as presented in Table 4. As seen in the table, the eigenvalues of the five components ranged from 1.55 to 6.61, exceeding the recommended threshold of 1.00 [42]. The EFA results supported the proposed five-component framework and provided a basis for subsequent CFA.

Table 4. Eigenvalues and percentage of variance explained of the media design and production competency assessment instrument

Components	Number of items	Eigenvalue	Percentage of variance explained
PIA	4	6.61	22.79
DPA	4	5.46	18.82
PA	7	4.26	14.68
IA	4	3.41	11.77
EA	10	1.55	5.33

3.2. Results of the validation of the proposed competency assessment model

The CFA was conducted at the first- and second-order levels to validate the proposed model and examine whether the five competency dimensions could be represented by a higher-order construct. The results are presented in Table 5. As shown in the table, all standardized factor loadings were significant (0.70–1.00, p<.001), indicating adequate representation of the latent constructs.

As seen in Table 6, all constructs met the recommended criteria for (CR>.70) and (AVE>.50), supporting convergent validity [25]. The results of the discriminant validity assessment indicated that the

square root of the AVE for each construct was greater than the correlations between constructs, as shown in Table 7. This suggests that the measurement model demonstrated acceptable discriminant validity [25]. As presented in Table 8, all five competency dimensions loaded significantly on the higher-order construct (0.78–0.85, p<.001), supporting the proposed competency structure. The model demonstrated acceptable fit to the data (χ^2=929, df=365, p<.001, CFI=0.95, TLI=0.94, SRMR=0.05, RMSEA=0.07), with all goodness-of-fit indices meeting the recommended criteria in Table 9 [25].

Table 5. First-order CFA of the media design and production competency assessment instrument

Variables	Items	Factor loadings B(SE)	***β***	t	p-value	R^2
PIA	PIA2	0.80	0.99	24.50	<.001	0.98
	PIA3	0.80	1.00	24.60	<.001	1.00
	PIA4	0.69	0.82	17.80	<.001	0.67
	PIA5	0.64	0.77	16.20	<.001	0.59
DPA	DPA1	0.86	1.00	24.80	<.001	1.00
	DPA2	0.62	0.76	16.00	<.001	0.58
	DPA3	0.58	0.71	14.30	<.001	0.50
	DPA4	0.85	1.00	24.80	<.001	1.00
PA	PA1	0.74	0.85	18.50	<.001	0.72
	PA2	0.79	0.90	20.00	<.001	0.81
	PA3	0.77	0.87	19.20	<.001	0.76
	PA4	0.70	0.80	16.90	<.001	0.64
	PA5	0.76	0.84	18.00	<.001	0.71
	PA6	0.75	0.85	18.40	<.001	0.72
	PA7	0.69	0.77	16.00	<.001	0.60
IA	IA4	0.78	0.88	19.50	<.001	0.77
	IA5	0.78	0.88	19.30	<.001	0.77
	IA6	0.80	0.89	19.80	<.001	0.79
	IA7	0.84	0.93	21.40	<.001	0.87
EA	EA1	0.73	0.84	18.10	<.001	0.71
	EA2	0.69	0.78	16.20	<.001	0.61
	EA3	0.73	0.80	16.70	<.001	0.64
	EA4	0.71	0.76	15.60	<.001	0.58
	EA5	0.61	0.70	13.80	<.001	0.49
	EA6	0.73	0.83	17.60	<.001	0.69
	EA7	0.73	0.83	17.70	<.001	0.69
	EA8	0.66	0.72	14.50	<.001	0.52
	EA9	0.65	0.75	15.30	<.001	0.56
	EA10	0.72	0.82	17.60	<.001	0.67

Table 6. AVE and CR of the media design and production competency assessment instrument

Components	CR	AVE
PIA	0.94	0.81
DPA	0.93	0.77
PA	0.94	0.70
IA	0.94	0.80
EA	0.94	0.61

Table 7. Discriminant validity of the media design and production competency assessment instrument

Component	PIA	DPA	PA	IA	EA
PIA	0.90				
DPA	0.74	0.88			
PA	0.61	0.58	0.84		
IA	0.67	0.65	0.63	0.89	
EA	0.66	0.64	0.62	0.66	0.79

Table 8. Second-order CFA of the media design and production competency measurement model

Variables	Items	Factor loadings b(SE)	***β***	t	p-value	R^2
Media design and production competency (MDPC)	PIA	0.68	0.85	17.75	<.001	0.72
	DPA	0.71	0.83	17.20	<.001	0.69
	PA	0.58	0.78	13.54	<.001	0.61
	IA	0.67	0.82	15.38	<.001	0.67
	EA	0.59	0.81	13.94	<.001	0.66

Table 9. Results of the model fit assessment of the empirical data for the media design and production competency model

Index	Criteria	Result	Interpretation
χ^2/df	<3.00	2.545	Acceptable
CFI	≥0.90	0.95	Acceptable
TLI	≥0.90	0.94	Acceptable
SRMR	≤0.08	0.05	Acceptable
RMSEA	≤0.08	0.07	Acceptable

3.3. Conceptual framework of media design and production competency

The findings indicate that media design and production competency consists of five interrelated dimensions that collectively represent a process-oriented construct. This result supports previous research emphasizing the importance of integrated design and media production processes [48]–[50] and aligns with the ADDIE model and the 3P framework. The findings further suggest that competency development requires the integration of technical skills, creativity, problem-solving ability, and communication skills to support effective media production [48], [51].

3.4. Educational implications and contributions of the proposed model

The acceptable validity and reliability of the proposed model provide empirical support for the coherence of the five competency dimensions. Beyond its statistical validity, the framework offers a structured approach for organizing learning activities around digital media creation and the development of conceptual, functional, and audio-visual skills, thereby providing a basis for integrating learning outcomes, instruction, and assessment [3], [8], [49], [50]. The findings suggest that the framework can support authentic learning by engaging students in practical digital media production tasks that require creative thinking, problem-solving, and the application of media design principles [3], [48], [51]. Consistent with competency-based education, the model may serve not only as an assessment tool but also as a mechanism for promoting learner development and enhancing competency acquisition throughout the learning process [2], [50].

From a curriculum perspective, the framework provides a common foundation for competency assessment and curriculum improvement. By clearly defining key competency dimensions, it can facilitate closer alignment between educational outcomes, professional expectations, and the evolving needs of the media and creative industries [8], [9]. A major contribution of this study is the integration of the ADDIE model and the 3P framework into a validated, process-oriented competency framework for media design and production. Unlike assessment approaches that focus primarily on isolated technical skills, the proposed model incorporates cognitive, procedural, and reflective competencies across the media production workflow. The framework may also support quality assurance and continuous curriculum enhancement by providing evidence for curriculum evaluation and assessment improvement. In line with previous studies, validated assessment instruments can serve as valuable tools for monitoring educational quality and supporting continuous improvement within outcome-based education (OBE) [52].

4. CONCLUSION

This study developed and validated a competency assessment framework for media design and production. The findings supported a five-dimensional structure consisting of PIA, DPA, PA, IA, and EA, confirming the multidimensional nature of media design and production competency. A key contribution of this study is the development of a theory-informed and empirically validated framework that integrates competency assessment with the media production process. The framework provides a foundation for competency-based learning and assessment, supports formative assessment and feedback practices, and contributes to curriculum improvement, quality assurance, and competency development aligned with industry expectations.

This study was limited to undergraduate students from selected higher education institutions in Bangkok, Thailand, and was based on cross-sectional data. Future research should examine the applicability of the framework in other educational contexts, evaluate its predictive validity through longitudinal studies, and explore the role of creative thinking as a potential competency dimension. The proposed competency framework may assist educators and curriculum developers in designing authentic and project-based learning activities, implementing competency-based assessment, and aligning learning outcomes with industry expectations in media design and production programs.

This study was conducted with undergraduate students from selected higher education institutions in Bangkok, Thailand, using purposive sampling and cross-sectional data. Therefore, the generalizability of the findings and the examination of competency development over time remain limited. Future research should

validate the framework in different educational contexts and disciplines and investigate factors related to competency development, such as creativity, design experience, technology use, and instructional practices. Longitudinal and experimental studies are also recommended to examine the long-term effects of competency-based learning on professional readiness.

FUNDING INFORMATION

This research was supported by the Petchra Pra Jom Klao Master's Degree Research Scholarship from King Mongkut's University of Technology Thonburi, Thailand.

AUTHOR CONTRIBUTIONS STATEMENT

This journal uses the Contributor Roles Taxonomy (CRediT) to recognize individual author contributions, reduce authorship disputes, and facilitate collaboration.

Name of Author	C	M	So	Va	Fo	I	R	D	O	E	Vi	Su	P	Fu
Sirinrudee Yossothorn	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓		✓	
Prapassorn Wongdee	✓	✓		✓						✓		✓		

C : **C**onceptualization
M : **M**ethodology
So : **So**ftware
Va : **Va**lidation
Fo : **Fo**rmal analysis
I : **I**nvestigation
R : **R**esources
D : **D**ata Curation
O : Writing - **O**riginal Draft
E : Writing - Review & **E**diting
Vi : **Vi**sualization
Su : **Su**pervision
P : **P**roject administration
Fu : **Fu**nding acquisition

CONFLICT OF INTEREST STATEMENT

The authors declare no conflict of interest.

INFORMED CONSENT

Informed consent was obtained from all participants prior to data collection.

ETHICAL APPROVAL

This study was approved by the Human Research Ethics Committee of King Mongkut's University of Technology Thonburi (KMUTT), Thailand (KMUTT-IRB-COE-2025-089; May 2, 2025).

DATA AVAILABILITY

The data that support the findings of this study are available from the corresponding author upon reasonable request. The data are not publicly available due to privacy and ethical restrictions involving research participants.

REFERENCES

[1] A. B. Albarran, *The media economy*. New York: Routledge, 2023, doi: 10.4324/9781003392293.
[2] C. Soyka and N. Schaper, "Analyzing student response processes to refine and validate a competency model and competency-based assessment task types," *Frontiers in Education*, vol. 9, p. 1397027, Jun. 2024, doi: 10.3389/feduc.2024.1397027.
[3] J. Reyna, J. Hanham, and P. C. Meier, "A framework for digital media literacies for teaching and learning in higher education," *E-Learning and Digital Media*, vol. 15, no. 4, pp. 176–190, Jul. 2018, doi: 10.1177/2042753018784952.
[4] S. Pastore, "Using student learning assessment data to drive pedagogical innovation and quality in higher education: a meta-synthesis," *Higher Education Quarterly*, vol. 80, no. 2, Apr. 2026, doi: 10.1111/hequ.70117.
[5] A. A. Tawfik, J. Gatewood, J. J. Gish-Lieberman, and A. J. Hampton, "Toward a definition of learning experience design," *Technology, Knowledge and Learning*, vol. 27, no. 1, pp. 309–334, Mar. 2022, doi: 10.1007/s10758-020-09482-2.
[6] L. K. J. Baartman, T. J. Bastiaens, P. A. Kirschner, and C. P. M. van der Vleuten, "The wheel of competency assessment: Presenting quality criteria for competency assessment programs," *Studies in Educational Evaluation*, vol. 32, no. 2, pp. 153–170, Jan. 2006, doi: 10.1016/j.stueduc.2006.04.006.
[7] D. Boud and E. Molloy, *Feedback in higher and professional education: Understanding it and doing it well*. New York, NY, USA: Routledge, 2013, doi: 10.4324/9780203074336.
[8] M. Mulder, *Competence-based vocational and professional education: Bridging the worlds of work and education*, in Technical and Vocational Education and Training: Issues, Concerns and Prospects, vol. 23. Cham: Springer International Publishing, 2017, doi: 10.1007/978-3-319-41713-4.

[9] Organisation for Economic Co-operation and Development (OECD), *The future of education and skills 2030*. OECD Publishing, Paris, France, Jun. 2018, doi: 10.1787/54ac7020-en.

[10] L. H. Sillat, K. Tammets, and M. Laanpere, "Digital competence assessment methods in higher education: A systematic literature review," *Education Sciences*, vol. 11, no. 8, Aug. 2021, doi: 10.3390/educsci11080402.

[11] O. Kyrylova and Y. Harkavenko, "Leveraging media projects to implement a competency-based approach in journalism education," *Communications and Communicative Technologies*, no. 25, pp. 86–92, Jun. 2025, doi: 10.15421/292511.

[12] N. Derev'yanko, "Competence approach in designing a professional educational program media design," *Scientific Journal of Khortytsia National Academy*, no. 3, pp. 79–88, Jan. 2020, doi: 10.51706/2707-3076-2020-3-8.

[13] E. V. Kasyanova and K. V. Safonov, "Methodology for developing students' media competencies through media educational projects," (in Russian), *Bulletin of Krasnoyarsk State Pedagogical University named after VP Astafiev*, vol. 52, no. 2, pp. 46–57, Jun. 2020, doi: 10.25146/1995-0861-2020-52-2-199.

[14] R. M. Al-Zou'Bi, "Assessing the impact of media and information literacy on creative video content production," *Journal of Media Literacy Education*, vol. 17, no. 1, pp. 106–120, Apr. 2025, doi: 10.23860/JMLE-2025-17-1-7.

[15] R. Grassinger *et al.*, "Fostering digital media-related competences of student teachers," *SN Computer Science*, vol. 3, no. 4, pp. 1–7, Jul. 2022, doi: 10.1007/s42979-022-01135-8.

[16] T. Seechaliao, "Instructional strategies to produce educational media systematically," *Journal of Education and Learning*, vol. 13, no. 4, pp. 121–133, Apr. 2024, doi: 10.5539/jel.v13n4p121.

[17] L. A. T. Nguyen and A. Habók, "Tools for assessing teacher digital literacy: a review," *Journal of Computers in Education*, vol. 11, no. 1, pp. 305–346, Mar. 2024, doi: 10.1007/s40692-022-00257-5.

[18] G. Falloon, "From digital literacy to digital competence: the teacher digital competency (TDC) framework," *Educational Technology Research and Development*, vol. 68, no. 5, pp. 2449–2472, Oct. 2020, doi: 10.1007/s11423-020-09767-4.

[19] K. Tzafilkou, M. Perifanou, and A. A. Economides, "Development and validation of students' digital competence scale (SDiCoS)," *International Journal of Educational Technology in Higher Education*, vol. 19, no. 1, p. 30, Dec. 2022, doi: 10.1186/s41239-022-00330-0.

[20] J. M. Soriano-Alcantara, F. D. Guillén-Gámez, and J. Ruiz-Palmero, "Exploring digital competencies: validation and reliability of an instrument for the educational community and for all educational stages," *Technology, Knowledge and Learning*, vol. 30, no. 1, pp. 307–326, Mar. 2025, doi: 10.1007/s10758-024-09741-6.

[21] B. Audrin, C. Audrin, and X. Salamin, "Digital skills at work – Conceptual development and empirical validation of a measurement scale," *Technological Forecasting and Social Change*, vol. 202, May 2024, doi: 10.1016/j.techfore.2024.123279.

[22] R. M. Branch, *Instructional design: The ADDIE approach*. New York, NY, USA: Springer US, 2009, doi: 10.1007/978-0-387-09506-6.

[23] P. Banjong, "Learning dynamics in media production: towards the integration of 21st century skills for undergraduate communication arts students," *Journal of Research and Curriculum Development*, vol. 16, no. 1, pp. 15–27, 2026.

[24] S. T. Sudhindra and L. T. M. Blessing, "A framework for design competency assessment," *Proceedings of the Design Society*, vol. 1, pp. 91–100, Aug. 2021, doi: 10.1017/pds.2021.10.

[25] J. F. Hair, W. C. Black, B. J. Babin, and R. E. Anderson, *Multivariate data analysis*, 8th ed. Boston, MA: Cengage, 2019.

[26] A. Ghanad, "An overview of quantitative research methods," *International Journal of Multidisciplinary Research and Analysis*, vol. 6, no. 8, pp. 3794–3803, Aug. 2023, doi: 10.47191/ijmra/v6-i8-52.

[27] M. Ahmad and S. Wilkins, "Purposive sampling in qualitative research: a framework for the entire journey," *Quality and Quantity*, vol. 59, no. 2, pp. 1461–1479, Apr. 2025, doi: 10.1007/s11135-024-02022-5.

[28] A. L. Comrey and H. B. Lee, *A first course in factor analysis*. Hillsdale, NJ, USA: Psychology Press, 1992, doi: 10.4324/9781315827506.

[29] D. H. Jonassen, *Learning to solve problems: A handbook for designing problem-solving learning environments*. New York, NY, USA: Routledge, 2011, doi: 10.4324/9780203847527.

[30] T. Brown, "Design thinking," *Harvard Business Review*, vol. 86, no. 6, pp. 84–92, 2008.

[31] F. Wang and M. J. Hannafin, "Design-based research and technology-enhanced learning environments," *Educational Technology Research and Development*, vol. 53, no. 4, pp. 5–23, Dec. 2005, doi: 10.1007/BF02504682.

[32] N. Nonthamand, "Designing the video-based learning environments using workflow and scaffolding to enhance self-instructional video production ability of pre-service teacher," *Contemporary Educational Technology*, vol. 16, no. 1, pp. 1–17, Jan. 2024, doi: 10.30935/cedtech/14102.

[33] J. Herrington and R. Oliver, "An instructional design framework for authentic learning environments," *Educational Technology Research and Development*, vol. 48, no. 3, pp. 23–48, Sep. 2000, doi: 10.1007/BF02319856.

[34] D. A. Schön, *The reflective practitioner: How professionals think in action*. New York, NY, USA: Basic Books, 1983.

[35] A. T. Jebb, V. Ng, and L. Tay, "A review of key Likert scale development advances: 1995–2019," *Frontiers in Psychology*, vol. 12, pp. 1–14, May 2021, doi: 10.3389/fpsyg.2021.637547.

[36] D. F. Polit and C. T. Beck, "The content validity index: Are you sure you know what's being reported? critique and recommendations," *Research in Nursing & Health*, vol. 29, no. 5, pp. 489–497, Oct. 2006, doi: 10.1002/nur.20147.

[37] R. L. Ebel and D. A. Frisbie, *Essentials of educational measurement*, 5th ed. Englewood Cliffs, NJ, USA: Prentice-Hall, 1991.

[38] A. O. Mohamed, "The effect of design on the viewer's perception of media content and its role in problem solving," *Journal of Ecohumanism*, vol. 4, no. 1, pp. 1432–1447, Jan. 2025, doi: 10.62754/joe.v4i1.5956.

[39] D. K-man Yip, "Visual elements and design principles in media production," in *Advances in Intelligent Systems and Computing*, vol. 1218 AISC, 2020, pp. 283–288. doi: 10.1007/978-3-030-51626-0_36.

[40] X. Yu, "Print advertising design and production demonstration course design," *Highlights in Art and Design*, vol. 1, no. 3, pp. 154–157, Jan. 2023, doi: 10.54097/hiaad.v1i3.4155.

[41] J. Herrington, T. C. Reeves, and R. Oliver, *A guide to authentic e-learning*. New York, NY, USA: Routledge, 2010, doi: 10.4324/9780203864265.

[42] H. F. Kaiser, "An index of factorial simplicity," *Psychometrika*, vol. 39, no. 1, pp. 31–36, Mar. 1974, doi: 10.1007/BF02291575.

[43] M. W. Watkins, "Exploratory factor analysis: a guide to best practice," *Journal of Black Psychology*, vol. 44, no. 3, pp. 219–246, Apr. 2018, doi: 10.1177/0095798418771807.

[44] A. Stefana *et al.*, "Psychological, psychiatric, and behavioral sciences measurement scales: best practice guidelines for their development and validation," *Frontiers in Psychology*, vol. 15, p. 1494261, Jan. 2024, doi: 10.3389/fpsyg.2024.1494261.

[45] G. W. Cheung, H. D. Cooper-Thomas, R. S. Lau, and L. C. Wang, "Reporting reliability, convergent and discriminant validity with structural equation modeling: A review and best-practice recommendations," *Asia Pacific Journal of Management*, vol. 41, no. 2, pp. 745–783, Jun. 2024, doi: 10.1007/s10490-023-09871-y.

[46] C. Fornell and D. F. Larcker, "Structural equation models with unobservable variables and measurement error: algebra and statistics," *Journal of Marketing Research*, vol. 18, no. 3, pp. 382–388, Aug. 1981, doi: 10.2307/3150980.
[47] D. Goretzko, K. Siemund, and P. Sterner, "Evaluating model fit of measurement models in confirmatory factor analysis," *Educational and Psychological Measurement*, vol. 84, no. 1, pp. 123–144, Feb. 2024, doi: 10.1177/00131644231163813.
[48] Y. F. Kao, H. C. Chen, and J. H. Lo, "Exploring an interdisciplinary curriculum in product and media design education: knowledge innovation and competency development," *Sustainability (Switzerland)*, vol. 15, no. 23, p. 16369, Nov. 2023, doi: 10.3390/su152316369.
[49] R.-Y. Li and J. C.-Y. Sun, "Identifying key factors of dynamic ADDIE model for instructional virtual reality design: an exploratory study," *Interactive Learning Environments*, vol. 32, no. 10, pp. 6984–6996, Nov. 2024, doi: 10.1080/10494820.2023.2296519.
[50] Wahira, Ansar, and I. Tolla, "Analysis of the needs for developing the competence of elementary school supervisors through analysis design development implementation evaluation (ADDIE) model," *Kasetsart Journal of Social Sciences*, vol. 44, no. 4, pp. 1303–1312, 2023, doi: 10.34044/j.kjss.2023.44.4.34.
[51] S. Guaman-Quintanilla, P. Everaert, K. Chiluiza, and M. Valcke, "Impact of design thinking in higher education: a multi-actor perspective on problem solving and creativity," *International Journal of Technology and Design Education*, vol. 33, no. 1, pp. 217–240, Mar. 2023, doi: 10.1007/s10798-021-09724-z.
[52] S. J. Wafudu, Y. Kamin, and D. Marcel, "Validity and reliability of a questionnaire developed to explore quality assurance components for teaching and learning in vocational and technical education," *Humanities and Social Sciences Communications*, vol. 9, no. 1, pp. 1–10, Sep. 2022, doi: 10.1057/s41599-022-01306-1.

BIOGRAPHIES OF AUTHORS



Sirinrudee Yossothorn is a graduate student at the Department of Educational Communications and Technology, Faculty of Industrial Education and Technology, King Mongkut's University of Technology Thonburi (KMUTT), Thailand. Her research interests include creative media design, competency development, and educational innovation. Research focuses on developing and validating competency models using quantitative research methods, particularly exploratory factor analysis (EFA) and confirmatory factor analysis (CFA). Current research investigates creative media design and production competencies among students in higher education and aims to support curriculum development and enhance learning outcomes in media-related programs. She can be contacted at email: sirinrudee.yosso@mail.kmutt.ac.th.



Prapassorn Wongdee received Bachelor of Education (B.Ed.) degree in Secondary Education, majoring in Physics and Mathematics, from Khon Kaen University, Thailand in 1992. She completed Master of Education (M.Ed.) degree in Educational Research from Chulalongkorn University, Thailand in 1997, and Ph.D. degree in Educational Research and Evaluation from Naresuan University, Thailand in 2013. Appointed assistant professor in Education in 2018. Main research topics include: research to develop student learning in educational institutions and workplaces; constructing and determining the structural validity of learning assessment tools; and developing student learning through coaching processes. Areas of expertise in learning management and training include: research for learning development and educational research; learning assessment and competency evaluation; statistics for behavioral and social science research; educational evaluation; integrating coaching skills for learning development. She can be contacted at email: prapassorn.won@mail.kmutt.ac.th.