International Journal of Learning, Teaching and Educational Research
Vol. 24, No. 5, pp. 23-39, May 2025
https://doi.org/10.26803/ijlter.24.5.2
Received Mar 16, 2025; Revised Apr 30, 2025; Accepted May 6, 2025

Digital Content on Google Sites for Course Subjects to Enhance Digital Literacy through Self-Directed Learning for Thai Students

Amornrat Kittipongpisut, Pornpapatsorn Princhankol and Kuntida Thamwipat*
King Mongkut's University of Technology Thonburi,
Bangkok, Thailand

Abstract. Due to its ease of use, Google Sites has become a popular choice for instructional purposes, this study aimed to develop and evaluate the quality of digital content on Google Sites for course subjects to enhance digital literacy through self-directed learning for Thai students, compare students' perceptions before and after engaging with the digital content, and assess students' satisfaction with the developed digital content. The research instruments included digital content on the Google Site for the course ETM 358 Marketing Communication, quality assessment tools for content and media presentation, a perception evaluation form, and a satisfaction evaluation form. Data were collected during the first semester of the 2024 academic year from 30 students who voluntarily responded to the survey out of a total population of 33 students enrolled in the subject. Data analysis involved statistical methods such as mean, standard deviation, and t-test. The findings indicated that the developed digital content consisted of eight short video episodes and infographic posters hosted on Google Sites for course subjects. The quality assessment by experts rated the content and media presentation at a very good level, respectively. A significant improvement in students' perceptions was observed after engaging with the digital content and activity (t-test = 4.60, $p < .01$). Additionally, students' satisfaction with the learning materials was rated at the highest level. These findings suggest that the developed digital content on Google Sites is of high quality and can be effectively utilised.

Keywords: Digital Content; Digital Literacy; Google Sites; Self-Directed Learning

*Corresponding author: *Kuntida Thamwipat, kuntida.tha@kmutt.ac.th*

1. Introduction

In today's knowledge-based society, professional practice increasingly relies on knowledge rather than physical labour. Lifelong learning is essential, with ICT skills and Information Literacy being crucial for the 21st-century workforce. To support this shift, Thailand's "Thailand 4.0" model prioritises telecommunications infrastructure and nationwide internet expansion to drive innovation-led economic and social progress. The rapid rise of digital technology has transformed how society creates, uses, and shares digital information. While accessing and distributing content online has become easier, responsible usage within legal and ethical boundaries remains a challenge. Misuse of digital information—without considering accuracy or appropriateness—is widespread. Given digital media's role in education and development, Digital literacy is essential. It involves accessing, managing, and responsibly using digital media while navigating online interactions effectively. As technology evolves faster than societal adaptation, challenges related to ethics, legality, and social norms persist. The education sector, in particular, must integrate digital literacy systematically. Enhancing digital literacy is crucial for ensuring responsible and effective engagement with information technology. Leenaraj (2017), aligned with Anutarakul (2021), defined digital literacy as the ability to understand and use digital technologies—a fundamental skill set that enhances work efficiency, communication, and collaboration under the concept of "Work less but get more impact." Additionally, digital literacy facilitates value co-creation, the economy of scale, and the transition towards Thailand 4.0. It also serves as a tool enabling individuals to engage in lifelong learning, enhance their professional competencies, and access better career opportunities (Learn and Grow). These perspectives align with the findings from Tinmaz et al. (2022) in their systematic review of digital literacy highlighted the rising importance of digital literacy in education and work, especially amid digital disruption and COVID-19. Most research is qualitative, categorising digital literacy into four themes: literacy, competencies, skills, and thinking. Traditionally defined as cognitive processes or discrete operations, digital literacy is now seen as integrating computer, media, cultural, and disciplinary literacy. Beyond technical skills, it involves media engagement within broader contexts. With qualitative studies dominating, more quantitative and mixed-methods research is needed for a deeper understanding.

Google Sites is a user-friendly service that allows individuals to create websites easily, originally designed for internal information-sharing. It functions similarly to website creation tools like Microsoft FrontPage or Macromedia Dreamweaver, but with a simpler interface. Users benefit from Google's reliable servers, ensuring stability and no downtime, with free accounts offering up to 100 MB of storage. Google Sites enables users to create personal websites for sharing information and updates, with the URL structure: http://sites.google.com/site/(chosen name). It is accessible even for those with no web development experience, requiring just a Google account to register. Key features include no need for HTML knowledge, multimedia support (images, text, attachments), access control for permissions, and collaboration tools for multiple users. These features make it ideal for educational use, allowing instructors to create course websites and enhance

digital learning experiences (Google, 2025). According to the MICE Intelligence Center (2024), Thailand's digital content industry has received significant support through Soft Power promotion policies aimed at positioning the country as a Digital Content Hub in the Asia-Pacific region. This initiative focuses on enhancing digital technology skills across all sectors of the workforce, including both public and private organisations, while also empowering retirees to utilise digital technology for income generation and employment. This strategy enables this demographic group to actively contribute to the digital economy. Furthermore, the Thai government is promoting workforce participation in the digital industry, with an ambitious target of producing 500,000 digital professionals by the year 2030. This effort aligns with national strategies for advancing digital capabilities and fostering digital startups by encouraging them to commercialise research and development outcomes. The ultimate goal is to cultivate sustainable businesses that thrive both domestically and internationally. Achieving these objectives requires higher education institutions to play a crucial role in connecting this initiative with university-level education, particularly in science and technology fields. King Mongkut's University of Technology Thonburi (2025) is one such institution aligning with the country's core policies through its three-fold mission:

1. To develop its personnel to be capable of learning, and to develop its students to be the best academically, to have virtue, morality, and work ethics.
2. To develop the educational systems, educational quality assurance systems, learning systems, and continuous quality management systems, and
3. To conduct research and utilise the findings to formulate knowledge and develop the Thai community.

Within the Faculty of Industrial Education and Technology, the Bachelor of Technology programme in Education Technology and Mass Communication has been established to continuously produce highly qualified graduates for the Thai labour market. The programme's primary objective is to develop graduates who possess both academic excellence and ethical integrity, with a particular emphasis on the responsible and ethical application of digital technology in accordance with professional standards. Modern approaches to learning and instructional management must integrate essential components, particularly the social dimension, which highlights learning as a social process emerging from networked interactions among learners. Additionally, effective learning environments should incorporate situational learning elements as well as reflective learning practices to facilitate knowledge expansion and experience exchange. Furthermore, fostering active engagement and integrative learning is crucial for achieving comprehensive educational outcomes (Siemens & Tittenberger, 2009). The ETM 358 Marketing Communication course is offered every first semester, and this year, the department has set a policy to focus on equipping students with knowledge and skills in TikTok Marketing. This decision is based on compelling data from Money and Banking Online (2025), which revealed that TikTok Shop experienced an eightfold growth in sales for Thai stores

and brands over the past year. The growth of TikTok Shop in Thailand is reflected by a 300% increase in orders during the 12.12 campaign, indicating the success of targeted marketing strategies. Over the past year, Thai brands and merchants have rapidly grown by utilising marketing tools and participating in promotional campaigns, especially through high-quality content creation and engagement by Thai creators, which has driven the expansion of Thai businesses and brands. Support from TikTok Shop, such as online training and partnerships with government agencies, has helped enhance e-commerce skills and assisted over 10,000 small businesses in launching online stores, resulting in sustainable growth and expansion in the digital market.

For this reason, the Educational Communications and Technology programme, recognising the significance of digital media in teaching and learning for modern technology graduates, has adopted a policy focused on developing digital content on Google Sites to promote digital literacy through self-directed learning (SDL) for Thai technology students. According to the Training Division of the Department of Lands, Ministry of Interior (2016), SDL is a crucial approach for enhancing individual potential by acquiring knowledge and preparing for self-improvement. This process involves filling knowledge gaps and expanding one's understanding in new areas. SDL is particularly suitable for individuals with maturity and the ability to take responsibility for their learning. Learners must demonstrate curiosity, determination, and enthusiasm in seeking knowledge based on necessity, aptitude, and personal interest. Self-directed learning (SDL) serves as a fundamental pillar in enhancing individuals' capabilities to adapt and respond to societal changes, especially in today's rapidly evolving and highly competitive technological landscape. Those who can learn independently have a greater ability to continuously develop their skills and knowledge more effectively than those who rely solely on instruction from teachers. Additionally, advancements in technology and modern media innovations have facilitated easier access to learning resources, further encouraging a sense of responsibility for SDL. Therefore, promoting effective SDL is a key factor in developing human resources that align with contemporary social and technological transformations. To this end, third-year students, who possess higher levels of maturity and self-responsibility and who are interested in enrolling in elective courses on marketing communication, should have access to modern, easily accessible teaching materials that enhance their digital skills and foster digital literacy. This initiative also aims to better prepare technology graduates for entry into the digital industry, which serves as the foundation for this research study.

Objectives:

1. To develop and evaluate the quality of digital content on Google Sites for course subjects to enhance digital literacy through SDL for Thai Bachelor of Technology students.
2. To compare students' perceptions before and after engaging with the digital content on Google Sites for course subjects to enhance digital literacy through SDL for Thai Bachelor of Technology students.

3. To assess students' satisfaction with the digital content on Google Sites for course subjects to enhance digital literacy through SDL for Thai Bachelor of Technology students.

2. Literature Review

The study of concepts and related research relevant to this study highlights key issues as presented below.

2.1 Digital Literacy

Relevant research on this topic in Thailand includes the study of "Test Development for Assessing Multidimensional Digital Literacy for Mathayomsuksa 1: Applying Construct Modelling" by Lao-iem et al. (2021). The concept of digital literacy is explored as the ability to access online knowledge, evaluate information credibility, and use software to independently collect, present, and generate information. Researchers also recommend that instructors assess students' digital literacy before and after learning to effectively measure progress and development. In addition, Chuenchom et al. (2021) conducted research on "Digital Literacy Skill Development of Chiang Mai Rajabhat University Students for Improving Learning Quality." The research findings indicate that the model for developing digital literacy skills consisted of four components: the process of skill development, learning materials, learning channels, and the university environment. Additionally, teaching support should include modern digital platforms to enhance online learning, enabling independent study and effective collaboration. Studies have been conducted in international contexts on this subject. Fernando and Jain (2022) conducted a study on "Digital Illiteracy of Teachers and Its Impact on Online Learning". The findings revealed that digitalisation has transformed many aspects of life by addressing the limitations of traditional methods and improving outcomes. This study focuses on digital illiteracy among teachers and its impact on online education. Additionally, a study by Islamia and Arif (2024), titled "Assessing Digital Literacy Skills among Indonesian University Students in the Age of Society 5.0", assesses the digital literacy skills of students in Indonesia, finding overall proficiency at a good level, though areas such as social and cultural understanding need improvement. The highest scores were in information seeking, communication, digital security, collaboration, and creativity. Based on a review of both domestic and international research on digital literacy, which is of significant importance for students in Thailand, the researcher has developed digital content in the form of infographic posters summarising key points and eight short video clips on TikTok Marketing. These materials are hosted on the Google Sites platform for the course ETM 358. This development aims to promote digital literacy through SDL for Thai Bachelor of Technology students.

2.2 Self-Directed Learning

A review of relevant research in Thailand on this topic includes a study by Matchima et al. (2021), titled "Factors Related to Self-Directed Learning Behaviors of Students in the Faculty of Science, Ubon Ratchathani Rajabhat University". The study found that SDL allows individuals to take responsibility for their learning independently, without continuous teacher guidance. It involves stages like personal initiative, needs assessment, method selection, resource identification, strategy implementation, and evaluation. The study highlights the importance of nurturing these factors to help students become responsible, lifelong learners. A review of relevant research on this topic conducted internationally includes a study titled "Self-Directed Learning In Higher Education: Practices and Issues", conducted by Abeyrathnem et al. (2020). The findings revealed that SDL is vital for promoting lifelong learning, and its integration into higher education is key to preparing students for modern challenges. Overcoming these obstacles will help higher education institutions support students in becoming independent, lifelong learners, ready to succeed in an evolving global landscape. Similarly, Doo and Zhu (2024) conducted a study titled "A Meta-analysis of Effects of Self-Directed Learning in Online Learning Environments". This study synthesises research on the effects of SDL on learning achievement in online environments. Educational institutions should focus on fostering SDL competencies, particularly motivation and self-monitoring, to optimise learning achievements in online settings. Morris (2024) stated that SDL is a core concept in adult education, serving as a fundamental skill for navigating an increasingly complex world. However, the construct of SDL has become unclear. This paper introduces a model of "Four Dimensions of Self-Directed Learning," presenting two key points: (1) SDL consists of four main dimensions, and (2) the responsibility and self-regulation needed for SDL differ from those required in teacher-directed learning.

Since the learners in this study were students enrolled in the Bachelor of Technology programme and based on the review of research studies both domestically and internationally on SDL, the researcher developed digital content in the form of summary infographic posters and eight short video clips on TikTok Marketing hosted on the Google Sites platform for the ETM 358 course. This initiative aimed to promote digital literacy through SDL among Thai Bachelor of Technology students. This research began with an assessment of student learning needs, identifying topics students were interested in studying. Based on these findings, instructional media were designed and developed accordingly. Learning agreements and schedules were established, and each lesson included a lesson summary within four weeks. Students were required to assess their knowledge before and after learning and evaluate their satisfaction with the learning process. The SDL approach was divided into three key stages:

1. Preparation Stage – Preparing both instructors and students. Instructors guide students in identifying their learning objectives, ensuring that students have a sufficient foundation for SDL.
2. Learning Stage – Students set their learning goals, while instructors provide guidance on learning strategies and planning. Students then follow their personalised learning plans.

3. Evaluation Stage – Assessing students' learning outcomes through perception evaluation tools to measure their learning progress and understanding.

3. Methodology

3.1 Research Process

This research was conducted as a research and development study that involved the analysis and synthesis of foundational information related to the development of digital content on the Google Sites platform for the ETM 358 course. The content development process followed the ADDIE Model (Nichols Hess & Greer, 2016), which consists of five key stages:

1. Analysis – Identifying content requirements for TikTok Marketing and designing eight short video clips, each not exceeding three minutes in length.
2. Design – Developing digital content in two formats: infographic summary posters and short video clips (eight in total).
3. Development – Implementing the digital content within the ETM 358 Marketing Communication Google Sites platform. The developed materials were evaluated for quality by three subject matter experts and three media presentation experts.
4. Implementation – Publishing the digital content on the ETM 358 Marketing Communication Google Sites platform. The instructor utilised a private Facebook group for the course as an additional communication channel outside the classroom, ensuring regular posts every week from Week 1 to Week 15 of the academic semester. The instructor also uploaded the infographic summary posters and short video clips onto Google Sites and specified access periods. Additionally, students were assigned to work in groups to create short-form video content on TikTok, introducing food stalls in the college cafeteria. This project had to be completed within a designated four-week period.
5. Evaluation – Assessing students' comprehension before and after engaging with the digital content, as well as evaluating their satisfaction with the developed materials.

3.2 Participants

This study was conducted during the first semester of the 2024 academic year. Data were collected from students enrolled in the ETM 358 Marketing Communication course. A total of 30 students voluntarily participated in the study through a simple random sampling technique by completing the questionnaires, and 33 students had officially registered for the course, which used digital content on the Google Sites platform to promote digital literacy through SDL.

3.3 Instruments

The research instruments used in this study included:

1. Digital Content – Infographic summary posters and eight short video clips on TikTok Marketing, developed and hosted on the Google Sites platform for the ETM 358 course. This content was designed to promote digital literacy through SDL.
2. Content and Media Quality Assessment Form – A five-point checklist used to evaluate the quality of both the instructional content and media presentation.
3. Learning Perception Assessment Form – A five-point checklist used to assess students' comprehension before and after engaging with the digital content.
4. Learner Satisfaction Assessment Form – A five-point checklist used to measure students' satisfaction with the developed digital content.

All assessment instruments utilised a five-point Likert scale, consisting of five levels: 5, 4, 3, 2, and 1. The researcher initially developed the assessment forms and submitted them for review by the thesis advisor to ensure accuracy and appropriateness. Revisions were made accordingly before the instruments were further evaluated by subject matter experts to determine content validity using the Index of Item-Objective Congruence (IOC). The IOC values ranged from 0.80 to 1.00, exceeding the acceptable threshold of 0.5. Additionally, the study obtained ethical approval under the human research ethics certification KMUTT-IRB-COE-2024-145 before proceeding with data collection.

3.4 Data Analysis

The data were collected from a sample of 30 participants obtained through simple random sampling. The collected data were analysed using statistical methods, including the calculation of mean, standard deviation, and t-test. The interpretation of the mean scores was based on the following criteria (Krupee, 2009):

4.51 - 5.00 means Very Good / Highest
3.51 - 4.50 means Good / High
2.51 - 3.50 means Moderate
1.51 - 2.50 means Low
1.00 - 1.50 means Lowest

4. Results

4.1 Development of Digital Content

The development of digital content consisted of infographic summary posters and eight short video clips on TikTok Marketing, hosted on the Google Sites platform for the ETM 358 course. This content was designed to enhance digital literacy through SDL. Sample images of the developed materials are presented below:

Figures 1-3: Digital content in the form of infographic summary posters and short video clips on the Google Sites platform

4.2 Evaluation of Content Quality by Experts

Table 1: The evaluation results of the content quality as assessed by experts

Evaluation Criteria	$\bar{x}$	S.D.	Quality Level
1. Content Quality			
1.1 Content alignment with objectives	5.00	0.00	Very Good
1.2 Accuracy of content	4.67	0.58	Very Good
1.3 Conciseness and clarity of content	4.33	0.58	High
1.4 Appropriateness of content organisation and sequencing	5.00	0.00	Very Good
Overall Content Quality	**4.75**	**0.29**	**Very Good**
2. Language Use			
2.1 Accuracy of language usage	4.33	0.58	High
2.2 Appropriateness of language usage	5.00	0.00	Very Good
2.3 Clarity of language for communication	4.67	0.58	Very Good
2.4 Ease of comprehension	4.67	0.58	Very Good
Overall Language Quality	**4.66**	**0.43**	**Very Good**
Overall Evaluation	**4.70**	**0.36**	**Very Good**

Note. Evaluation by three content experts and three media presentation experts.

Table 1 shows the evaluation results of content quality by experts. Overall, the experts assessed the quality of the digital content on the Google Sites platform for the ETM 358 course, developed to enhance digital literacy, at a very good level ($\bar{x}$= 4.70, S.D. = 0.36). Specifically, the content quality was rated at a very good level ($\bar{x}$= 4.75, S.D. = 0.29), while the language use was also rated at a very good level ($\bar{x}$= 4.66, S.D. = 0.43), respectively.

Table 2: Evaluation Results of Presentation Media Quality by Experts

Evaluation Criteria	$\bar{x}$	S.D.	Quality Level
1. Typography			
1.1 Clarity of text	4.67	0.58	Very Good
1.2 Appropriateness of text placement	4.33	0.58	Good
1.3 Readability on screen	5.00	0.00	Very Good
Overall Typography Quality	**4.66**	**0.38**	**Very Good**
2. Design and Presentation			
2.1 Simplicity and clarity of design layout	5.00	0.00	Very Good
2.2 Appropriateness of colours and graphics used	5.00	0.00	Very Good
2.3 Suitability of integrating instructional clips	5.00	0.00	Very Good
Overall Design and Presentation Quality	**5.00**	**0.00**	**Very Good**
Overall Evaluation	**4.83**	**0.19**	**Very Good**

Note. SD = Standard Deviation.

From Table 2, the evaluation results of the presentation media quality by experts indicate that the overall quality of the digital content on the Google Sites course page for ETM 358 to promote digital literacy was rated at a very good level ($\bar{x}$= 4.83, S.D. = 0.19). Specifically, the design and presentation aspect received the highest rating of very good ($\bar{x}$= 5.00, S.D. = 0.00), while the typography aspect was also rated at a very good level ($\bar{x}$= 4.66, S.D. = 0.38), respectively.

4.3 Comparison of Students' Perceived Knowledge Before and After Viewing the Developed Digital Content

Table 3: The results of comparing students' perceived knowledge before and after viewing the digital content

Evaluation Phase	n	$\bar{x}$	S.D.	t	df	Sig.
Before viewing the content	30	3.90	0.99	4.60	29	0.0008**
After viewing the content	30	4.80	0.41			

**Statistical significance at p <.01

Table 3 compares students' perceived knowledge before and after viewing the digital content on the Google Sites course page for ETM 358 to enhance digital literacy. The findings indicate that before viewing the digital content, students' perceived knowledge of TikTok Marketing was at a high level ($\bar{x}$= 3.90, S.D. = 0.99). After viewing the digital content, their perceived knowledge increased to the highest level ($\bar{x}$= 4.80, S.D. = 0.41). The t-test results revealed a statistically significant improvement in perceived knowledge at the.01 level (t-test = 4.60).

4.4 Student Satisfaction with the Developed Digital Content

Table 4: The results of the student satisfaction evaluation

Evaluation Criteria	$\bar{x}$	S.D.	Satisfaction Level
Satisfaction with video content	4.70	0.70	Highest
Clarity and ease of understanding	4.50	0.63	High
Infographic summary posters	4.53	0.73	Highest
Sequence of instructional videos	4.40	0.55	High
Clarity of instructor's communication	4.50	0.49	High
Relevance of examples	4.67	0.66	Highest
Video duration appropriateness	4.67	0.89	Highest
Google Sites presentation	4.63	0.68	Highest
Course applicability	4.67	0.55	Highest
Satisfaction with self-learning videos	4.70	0.53	Highest
Overall	**4.59**	**0.64**	**Highest**

Note. SD = Standard Deviation.

From Table 4, the results of the student satisfaction evaluation indicate that students were highly satisfied with the developed digital content on the Google Site for the ETM 358 course, aimed at enhancing digital literacy. Overall, the satisfaction level was rated as the highest ($\bar{x}$= 4.59, S.D. = 0.64). The aspects that received the highest satisfaction were the content of the video clips and overall satisfaction with the self-learning video clips ($\bar{x}$= 4.70, S.D. = 0.70) and ($\bar{x}$= 4.70, S.D. = 0.53), respectively.

5. Discussion

5.1 The Results of the Development and Quality Assessment

The digital content on the Google Sites course page to promote digital literacy through SDL for Thai graduate technology students was developed using the five-step ADDIE Model. This approach is in line with the research of Kuswandi et al. (2021), which studied "Digital Learning Literacy Training and Mentoring using the ADDIE Model," and the study by Waiwingrob et al. (2023), which focused on "Active Learning Extracurricular Activities Using Digital Content to Promote the Awareness of Thai Arts and Culture for Undergraduate Students." Furthermore, the research by Thamwipat et al. (2024) on "The Development of Digital Content in the Metaverse Combined with Participatory Communication and Learning with Religious Leaders to Enhance Students' Perception of the Community Mosque" also used the ADDIE Model in the development of learning media for students, leading to quality content that is appropriate for the learning needs of the new generation. The quality evaluation results on content and presentation media by experts showed very high ratings ($\bar{x}$ = 4.70, S.D. = 0.36) and ($\bar{x}$ = 4.83, S.D. = 0.19), respectively. An interesting point was that the evaluation of design and presentation was rated very high ($\bar{x}$ = 5.00, S.D. = 0.00). Specific aspects included easy-to-understand and simple design elements, the appropriateness of colours and graphics used in the presentation, and the suitability of uploading instructional videos on the course Google Sites platform. The quality of this digital content aligns with the principles outlined by Nimmanpatcharin (2020), Director-General of the Digital Economy Promotion Agency (DEPA). According to DEPA, Thailand's digital content industry demonstrated an average growth rate of 26.55% in 2020, reaching a market value of 39,332 million THB (Thai Bhat). The agency projected continued expansion over the next three years, with estimated values of 49,649 million THB in 2021, 59,136 million THB in 2022, and a potential rise to 72,703 million THB by 2023. In response to the growing trend, DEPA has implemented initiatives to promote sustainable growth in Thailand's digital content industry. Key efforts include enhancing industry expertise by developing professionals' knowledge and experience, collaborating with social media platforms to support high-quality content production, and promoting digital literacy, especially among younger generations pursuing influencer careers. These initiatives aim to position Thailand's digital content industry as a key driver of economic and social transformation, ensuring long-term sustainability and global competitiveness. Consequently, higher education promoting digital content production and usage should be strongly encouraged in Thailand.

5.2 The Comparison of Students' Perceptions Before and After Viewing the Digital Content

The course Google Site, designed to promote digital literacy through SDL for Thai undergraduate students, showed that before viewing the digital content, students' perception of TikTok Marketing was at a high level ($\bar{x}$ = 3.90, S.D. = 0.99). After viewing the digital content, their perception of TikTok Marketing increased to the highest level ($\bar{x}$ = 4.80, S.D. = 0.41). The t-test revealed that there was a statistically significant increase in their perception at the 0.01 level (t-test = 4.60). This is consistent with the research by Smith and Storrs (2023), which studied "Digital Literacies, Social Media, and Undergraduate Learning: What do Students Think They Need to Know?" Their findings confirmed prior research, demonstrating that the majority of undergraduate students use social media both in their university learning and daily lives. While no significant differences were found between student groups regarding social media use in academic settings, notable differences emerged in their everyday use of social media. Students in the humanities and social sciences reported higher social media usage in their daily lives compared to those in the sciences. Additionally, they expressed stronger agreement on the importance of digital literacy for their future professions or disciplines and generally reported gaining more knowledge about digital literacy during their time at university. Furthermore, research by Kateryna et al. (2020) on "Digital Literacy Development Trends in the Professional Environment" found that the level of proficiency in digital skills determines an individual's success and employment prospects. The study highlighted an increasing demand for adaptability and digital skills among professionals. Developing digital fluency significantly impacts employees' work quality. A key attribute of a talented employee is the ability to integrate various educational technologies, training formats, and technical innovations into a cohesive educational system. It is also essential to strike a balance between traditional full-time learning models and emerging digital tools such as mobile technologies and augmented reality. Furthermore, an appropriate distribution of responsibilities between educators and digital learning support tools is crucial.

5.3 The Evaluation Results of Students' Satisfaction With the Digital Content

On the course Google Site to Promote Digital Literacy through SDL for Thai undergraduate students revealed that students were highly satisfied with the digital content on the ETM 358 course Google Site, with an overall satisfaction rating of "highest" ($\bar{x}$ = 4.59, S.D. = 0.64). The area of highest satisfaction was related to the content of the video clips, as well as the overall satisfaction with the SDL video clips ($\bar{x}$ = 4.70, S.D. = 0.70) and ($\bar{x}$ = 4.70, S.D. = 0.53). The content on TikTok Marketing aligns with the research of Napontun and Pimchainoi (2023) on "The Influence of Marketing Promotion Tools on Customer Satisfaction and Repurchase Intention: A Study on TikTok Marketing Platform. Service, Leisure, Sport, Tourism & Education." The study found that TikTok is a popular social media platform known for its short videos, including lip-syncing, dancing, and entertainment. It has become an effective marketing tool, competing with Facebook and Instagram for business promotions. Marketers use TikTok to

provide product information, influence purchasing decisions, and raise awareness. Research indicates that sales promotions and sales personnel are the most influential marketing tools on TikTok, with sales promotions, such as discounts and giveaways, having the greatest impact on consumer satisfaction. Therefore, students were satisfied with the content presented in the digital content package. Additionally, the aspect of SDL aligns with the research by Bosch and Laubscher (2022) on "Promoting Self-Directed Learning as Learning Presence through Cooperative Blended Learning." The study found that SDL is a critical 21st-century skill for becoming a successful lifelong learner. Regarding SDL categories, all four were evident in the study's findings. Various aspects of SDL, particularly in terms of learning presence, were actively promoted in the cooperative blended learning course. Moreover, the research by Zhu et al. (2024) on "Exploring Students' Self-Directed Learning Strategies and Satisfaction in Online Learning" found that this study provides insights into the SDL strategies of online learners and the instructional design elements that influence their satisfaction with online courses. The findings have important implications for online instructors and instructional designers, emphasising how course design can facilitate SDL and enhance learner satisfaction. Overall, the online learners in this study reported satisfaction with their learning experience. However, their level of satisfaction was strongly influenced by the specific design and delivery of the course.

6. Limitations

Self-directed learning (SDL) for Thai graduate technology students, a case study of students in the course ETM 358, through the use of digital content on the course's Google Site to promote digital literacy, involved the instructor using a closed Facebook group as a communication tool outside of the classroom. Content related to lessons, activities that students needed to complete, and clear grading criteria were posted consistently every week from the first week to the 15th week throughout the semester. This allowed students to become familiar with this mode of communication. In posting supplementary learning materials, the instructor uploaded the digital content and assigned students to work in groups to create short TikTok videos introducing food stalls in the college cafeteria. This had to be completed within the 4-week timeframe, and students were not allowed to work at their convenience. Specific conditions were set to facilitate SDL, under the constraints of a limited period and an activity that helped reinforce the concepts of TikTok Marketing, which were studied through the digital content on the course's Google Site.

7. Conclusion

The research findings indicate that digital content was developed, featuring infographics posters, and short videos on the Google Site for the course ETM 358 to promote digital literacy through SDL for Thai graduate technology students. The SDL approach includes three stages: the preparation stage, the learning stage, and the evaluation stage. The evaluation of content quality and presentation media by experts found that both were at a very good level. The assessment of the participants' awareness after viewing the media and engaging in activities

showed a significant statistical increase at the.01 level compared to before the viewing. Furthermore, the evaluation of participants' satisfaction was at the highest level. Recommendations include that digital content producers should divide the content into different episodes (ep.) with each video being no longer than 3 minutes. Additionally, they should create summary posters for each episode using visually appealing and modern infographics to better promote the retention of key content for students. Therefore, it is advised that instructors use Google Sites as an easy-to-use teaching tool, which is convenient for uploading various forms of content, in order to encourage SDL among students within the time constraints and activities assigned by the instructor. These are the essential considerations for instructors who upload digital content on Google Sites.

8. Recommendations

In the development of digital content on the course's Google Site to promote digital literacy through SDL for Thai bachelor technology students, it is recommended to use content that is short, simple, concise, clear, and aligned with topics of interest to the learners. Therefore, digital content producers should divide the content into episodes, and each episode or video should be no longer than three minutes. This is the optimal duration to enhance students' awareness. In addition to short videos, instructors should create summary posters for each episode using visually appealing, modern infographics to further promote the retention of key content for students.

Instructors can use Google Sites as an easy-to-use teaching tool that allows them to upload various types of teaching materials in multiple file formats. If there is a large amount of content, instructors can upload PDFs, teaching slides, and even e-books. Beyond being a teaching tool, Google Sites can also serve as a reference source for the course that the instructor is responsible for.

9. Acknowledgements

The researchers would like to express gratitude for the funding support for the development of teaching media from the FIET Connect project, Faculty of Industrial Education and Technology, King Mongkut's University of Technology Thonburi.

10. References

Abeyrathne, D. K., Ekanayake, S. Y., & Abeyrathne, D. K. (2020). Self-directed learning (SDL) in higher education: Practices and issues. *Asian Journal of Electrical Sciences, 9*(2), 40–49. https://doi.org/10.51983/ajes-2020.9.2.2555

Anutarakul, S. (2021). *Digital literacy*. Information Technology Division, Maejo University. https://erp.mju.ac.th/acticleDetail.aspx?qid=1246

Bosch, C., & Laubscher, D. J. (2022). Promoting self-directed learning as a learning presence through cooperative blended learning. *International Journal of Learning, Teaching and Educational Research, 21*(9), 17–34. https://doi.org/10.26803/ijlter.21.9.2

Chuenchom, S., Jairak, K., & Kowan, U. (2021). Digital literacy skill development of Chiang Mai Rajabhat University students for improving learning quality. *Journal*

of Information Science, 39(2), 16–33. https://so03.tci-thaijo.org/index.php/jiskku/article/download/250463/170035

Doo, M. Y., & Zhu, M. (2024). A meta-analysis of effects of self-directed learning in online learning environments. *Journal of Computer Assisted Learning, 40*(1), 1–20. https://doi.org/10.1111/jcal.12865

Fernando, J. G., & Jain, S. K. (2022). Digital illiteracy of teachers and its impact in online learning. *Technoarete Transactions on Application of Information and Communication Technology (ICT) in Education, 1*(3), 1–6. https://dx.doi.org/10.36647/TTAICTE/01.03.A001

Google. (2025). *Google Site*. https://docs.google.com/document/d/1vra_cKCNqXKjMFDcHGRynUpnZ7vcippmxf31IkKQe6g/edit?tab=t.0

Islamia, I., & Arif, A. R. (2024). Assessing digital literacy skills among Indonesian university students in the age of Society 5.0. *Journal of Educational Studies, 9*(2), 182–194. https://ejournal.uinbukittinggi.ac.id/index.php/educative/article/view/8678

Kateryna, A., Oleksandr, R., Mariia, T., Iryna, S., Evgen, K., & Anastasiia, L. (2020). Digital literacy development trends in the professional environment. *International Journal of Learning, Teaching and Educational Research, 19*(7), 55–79. https://doi.org/10.26803/ijlter.19.7.4

King Mongkut's University of Technology Thonburi. (2025). *About KMUTT*. https://www.kmutt.ac.th/en/about-kmutt/vision/

Krupee. (2009). *Rating scale*. https://krupee.blogspot.com/2009/09/rating-scale.html

Kuswandi, D., Zulnaidi, H., Kurniawan, C., Aulia, F., Thaariq, Z. Z., Wijanarko, D. A., Nafi'a, M. Z. L., & Maknuunah, L. L. (2021). Digital learning literacy training and mentoring using the ADDIE model. *Advances in Social Science, Proceedings of the International Conference on Information Technology and Education (ICITE 2021), Education and Humanities Research, 609*, 98–103. http://dx.doi.org/10.2991/assehr.k.211210.016

Leenaraj, B. (2017). Digital literacy skills for developing learning quality. *T.L.A. Bulletin, 61*(2), 76–92. https://so06.tci-thaijo.org/index.php/tla_bulletin/article/download/109391/86063/

Lao-iem, P., Tulmethakaan, M., & Meechan, S. (2021). Test development for assessing multidimensional digital literacy for Mathayomsuksa 1: Applying construct modelling. *Journal of Education Burapha University, 32*(3), 71–86. https://ojs.lib.buu.ac.th/index.php/education2/article/view/7796

Matchima, K., Vonglao, P., Sutthison, T., & Tepchim, S. (2021). Factors related to self-directed learning behaviors of students in the Faculty of Science, Ubon Ratchathani Rajabhat University. *Social Sciences Research and Academic Journal, 16*(1), 15–30. https://so05.tci-thaijo.org/index.php/JSSRA/article/view/246959

MICE Intelligence Center. (2024). *Unleash your creative power: Exploring opportunities in the digital content industry*. https://intelligence.businesseventsthailand.com/files/keyindustries/keyindustries_document1_97fb3cac9543fa4196924f2d06ff1785.pdf

Money & Banking Online. (2025). TikTok Shop reveals 8x sales growth for Thai shops and brands, with a 300% increase in orders during the 12.12 campaign. https://moneyandbanking.co.th/2025/148288/

Morris, T. H. (2024). Four dimensions of self-directed learning: A fundamental meta-competence in a changing world. *Adult Education Quarterly: A Journal of Research and Theory, 74*(3), 236–254. http://dx.doi.org/10.1177/07417136231217453

Napontun, K., & Pimchainoi, K. (2023). The influence of marketing promotion tools on customer satisfaction and repurchase intention: A study on TikTok marketing platform. *Service, Leisure, Sport, Tourism & Education, 1*(2), 1–25. https://so09.tci-thaijo.org/index.php/BTSMM/article/view/1315

Nichols Hess, A., & Greer, K. (2016). Designing for engagement: Using the ADDIE model to integrate high-impact practices into an online information literacy course. *Communications in Information Literacy, 10*(2), 264–282. https://doi.org/10.15760/comminfolit.2016.10.2.27

Nimmanpatcharin, N. (2020). *DEPA releases survey results and industry assessment of Thailand's digital content sector in 2020*. https://www.engineeringtoday.net/

Siemens, G., & Tittenberger, P. (2009). *Handbooks of emerging technologies for learning*. University of Manitoba. http://umanitoba.ca/learning_technologies/cetl.HETL.pdf

Smith, E. E., & Storrs, H. (2023). Digital literacies, social media, and undergraduate learning: What do students think they need to know? *International Journal of Educational Technology in Higher Education, 20*(29), 1–19. https://doi.org/10.1186/s41239-023-00398-2

Thamwipat, K., Pongpimol, P., Supinanont, P., & Princhankol, P. (2024). The development of digital content in the Metaverse combined with participatory communication and learning with religious leaders to enhance students' perception of the community mosque. *International Education Studies, 17*(1), 58–68. https://doi.org/10.5539/ies.v17n1p58

Tinmaz, H., Lee, Y. T., Fanea-Ivanovici, M., & Baber, H. (2022). A systematic review on digital literacy. *Smart Learning Environments, 9*, 1–18. https://doi.org/10.1186/s40561-022-00204-y

Training Division, Department of Lands, Ministry of the Interior. (2016). *Self-directed learning*. https://www.dol.go.th/train/DocLib1/14self.pdf

Waiwingrob, P., Thamwipat, K., & Princhankol, P. (2023). Active learning extracurricular activities using digital content to promote the awareness of Thai arts and culture for undergraduate students. *Humanities, Arts and Social Sciences Studies (HASSS, 23*(3), 42–65. https://doi.org/10.14456/hasss.2023.54

Zhu, M., Berri, S., Koda, R., & Wu, Y. (2024). Exploring students' self-directed learning strategies and satisfaction in online learning. *Education and Information Technologies, 29*, 2787–2803. https://doi.org/10.1007/s10639-023-11914-2