Relationship Between Digital Information Evaluation Skills and Self-Monitoring Among TVET Students, UTHM

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DOI: https://doi.org/10.47772/IJRISS.2026.100900776

Received: 26 September 2026; Accepted: 01 October 2026; Published: 23 October 2026

ABSTRACT

In the rapidly evolving digital education environment, students' ability to critically evaluate digital information and monitor their own learning has become increasingly important for effective learning and lifelong professional development. This study aimed to determine the levels of digital information evaluation skills and self-monitoring and to examine the relationship between these two variables among final-year Bachelor of Vocational Education (ISMPV) students at Universiti Tun Hussein Onn Malaysia (UTHM). A quantitative cross-sectional study employing descriptive and correlational survey designs was conducted with 186 students selected through purposive sampling. Data were collected using a structured questionnaire comprising items on digital information evaluation skills and self-monitoring and were analysed using SPSS Version 27 through descriptive statistics and Pearson's correlation analysis. The findings showed that students demonstrated a high level of digital information evaluation skills ($M = 4.063$, $SD = 0.271$) and a high level of self-monitoring ($M = 4.076$, $SD = 0.259$). Pearson's correlation analysis revealed a statistically significant positive relationship between digital information evaluation skills and self-monitoring ($r = .584$, $p < .001$). These findings indicate an association, rather than a causal effect: students reporting stronger digital information evaluation skills also tended to report stronger self-monitoring. The study highlights the relevance of integrating critical digital information evaluation, reflective learning, self-assessment, and metacognitive activities within TVET programmes. Further research is needed to determine the direction and mechanisms underlying this relationship.

Keywords: Digital information evaluation skills; Self-monitoring; TVET; Undergraduate students; Vocational education

INTRODUCTION

The rapid advancement of digital technologies has significantly transformed teaching and learning practices in higher education, providing students with unprecedented access to digital information through online databases, search engines, learning management systems, social media, and artificial intelligence (AI) tools (Vuorikari et al., 2022; European Commission, 2022). As learning environments become increasingly digitalised, university students are expected not only to access information efficiently but also to evaluate its credibility, relevance, and accuracy before applying it in academic contexts (Association of College and Research Libraries [ACRL], 2016; Georgopoulou et al., 2025). Consequently, digital information evaluation has emerged as an essential competency that supports critical thinking, informed decision-making, and lifelong learning (Vuorikari et al., 2022; Pérez-Escoda et al., 2021).

Within Technical and Vocational Education and Training (TVET), digital information evaluation is particularly important because students frequently rely on digital resources to acquire technical knowledge, solve practical problems, and support evidence-based learning (ACRL, 2016; Pérez-Escoda et al., 2021). Future TVET graduates are expected to have the ability to identify reliable information, compare multiple sources, recognise misinformation, and apply digital information ethically in both educational and professional settings (European Commission, 2022; Georgopoulou et al., 2025). These competencies are

increasingly recognised as fundamental components of digital competence required to prepare graduates for rapidly evolving workplaces and technology-driven industries (Vuorikari et al., 2022).

For the purposes of this study, digital information evaluation skills refer to the ability to identify, assess, analyse, and use digital information by judging its credibility, relevance, accuracy, and ethical appropriateness. This construct is narrower than general digital literacy because it focuses specifically on evaluative judgement and responsible use of digital information rather than the full range of technical, communication, content-creation, and problem-solving competencies associated with digital competence (ACRL, 2016; Vuorikari et al., 2022).

Self-monitoring refers to the metacognitive process through which learners observe and evaluate their own understanding, progress, and learning performance, including recognising difficulties and judging whether current learning approaches are effective (Panadero, 2017; Zimmerman, 2000). It is conceptually related to, but distinct from, the broader construct of self-regulated learning (SRL). SRL encompasses a wider range of cognitive, metacognitive, motivational, behavioural, and resource-management processes, including planning, strategy use, monitoring, effort regulation, time and learning-environment management, help-seeking, and subsequent adjustment of learning behaviour (Pintrich & De Groot, 1990; Zimmerman, 2000). Within this broader regulatory process, self-monitoring represents a specific metacognitive function centred on the learner's ongoing observation and evaluation of understanding and progress. Operationally, the measure used in this study was adapted from broader self-regulated learning components and therefore captures a broader self-regulatory context than metacognitive monitoring alone.

Previous studies have reported associations between digital or information literacy and students' learning autonomy, academic engagement, and self-regulated learning (Pérez-Escoda et al., 2021; Lim & Newby, 2021). Students who evaluate digital information more critically may also demonstrate stronger regulation of their learning (Georgopoulou et al., 2025; Ko, 2026). Conceptually, digital information evaluation and self-monitoring may be related because both involve critical judgement, reflective thinking, and metacognitive awareness (Zimmerman, 2000; ACRL, 2016). However, this conceptual overlap does not establish a causal direction between the two constructs.

Despite the growing body of literature, several important gaps remain. Although university students are increasingly dependent on digital technologies for learning, previous studies indicate that many students still experience difficulties in evaluating the credibility and accuracy of digital information, particularly in technology-rich learning environments (McGrew, 2020; Mohamad & Mohamad, 2025). At the same time, students' self-monitoring abilities have been reported to vary considerably, suggesting that not all learners are able to effectively regulate and evaluate their own learning processes (Panadero, 2017). These issues may reduce the effectiveness of learning when students rely on inaccurate information or fail to monitor their learning appropriately.

Within the TVET context, this issue becomes even more critical because students frequently depend on technical manuals, industry documents, digital platforms, and other technology-based learning resources to support both theoretical and practical learning (Rokeman et al., 2024). However, existing studies have primarily focused on digital literacy as a broad construct or on the effectiveness of digital technologies in TVET education (Dai et al., 2024), while limited attention has been given to digital information evaluation as a distinct competency and its relationship with self-monitoring. Consequently, empirical evidence explaining how these two competencies are related among Malaysian TVET students remains limited.

Addressing this gap is particularly important because future TVET graduates are expected to become competent professionals and educators who can critically evaluate digital information, regulate their own learning, and adapt to rapidly evolving digital environments (Zimmerman, 2000; Vuorikari et al., 2022). Understanding the relationship between digital information evaluation skills and self-monitoring may therefore provide valuable evidence for strengthening teaching and learning practices that promote independent, reflective, and lifelong learning among TVET students.

Accordingly, this study examined the relationship between digital information evaluation skills and self-

monitoring among final-year Bachelor of Vocational Education students at Universiti Tun Hussein Onn Malaysia (UTHM).

Specifically, the study aimed to:

- determine the level of digital information evaluation skills among TVET students at UTHM;
- determine the level of self-monitoring among TVET students at UTHM; and
- examine the relationship between digital information evaluation skills and self-monitoring among TVET
- students at UTHM.

RESEARCH METHODOLOGY

Research Design

This study employed a quantitative cross-sectional survey using descriptive and correlational research designs. The descriptive design was used to determine the levels of digital information evaluation skills and self-monitoring, while the correlational design examined the relationship between the two variables. This approach was appropriate for addressing the research objectives through statistical analysis.

Participants and Sampling

The study population comprised 353 active final-year Bachelor of Vocational Education (ISMPV) students at the Faculty of Technical and Vocational Education, Universiti Tun Hussein Onn Malaysia (UTHM), based on official student enrolment records as of 12 June 2026. The study used purposive sampling to recruit participants who met the eligibility criteria. Students were eligible if they were active final-year ISMPV students at UTHM and had experience using digital resources for academic learning. Students who were not in their final year were excluded. In addition, students from the Refrigeration and Air Conditioning programme who had participated in the pilot study were excluded from the main study to avoid repeated participation.

The Krejcie and Morgan (1970) sample-size table was used solely as a reference for determining the targeted sample size and did not alter the non-probability nature of the purposive sampling procedure. Based on a population of 353 students, the targeted sample size was 186, and a total of 186 students participated in the main study across six vocational specialisations. Data were collected through online and face-to-face distribution of the questionnaire using Google Forms and QR codes. Given the purposive sampling procedure and the single-institution setting, the findings are specific to the participating sample and should not be interpreted as statistically representative of all Malaysian TVET students.

Instrument Adaptation and Validation

The questionnaire consisted of three sections. Section A comprised five demographic items developed by the researcher. Sections B and C measured digital information evaluation skills and self-monitoring, respectively, using items adapted from existing measures (Table 1). All construct items were rated on a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree).

For digital information evaluation skills, the source instrument by Fareeha Nabila et al. (2024) comprised 17 items addressing students' ability to screen, evaluate, analyse, and use digital information effectively and ethically. During the adaptation process, 10 original items were retained, seven were removed because they were considered less appropriate to the context of the present study, and six new items were developed based on the literature and the conceptual requirements of the construct. The resulting 16-item measure was contextualised to the TVET learning environment at UTHM and conceptually organised into three dimensions: Digital Information Evaluation (6 items), Analysis and Use of Digital Information (5 items), and Ethics and Awareness in Digital Information Use (5 items).

Self-monitoring was measured using 19 items adapted from the self-regulated learning components of the Motivated Strategies for Learning Questionnaire (MSLQ) by Pintrich and De Groot (1990). The wording and contextual references were adapted to reflect the learning experiences of TVET students at UTHM. The items were conceptually organised into four components: Planning and Self-Learning Strategies (6 items), Self-Monitoring of Understanding (5 items), Time and Learning Environment Management (5 items), and Effort Regulation and Learning Assistance (4 items). Although these components were used to organise the instrument content, self-monitoring was analysed as an overall construct in accordance with the study objectives.

Table 1: Summary of the research instrument

Section	Construct	No. of Items	Source
A	Demographic information	5	Developed by the researcher
B	Digital Information Evaluation Skills	16	Adapted and modified from Fareeha Nabila et al. (2024)
C	Self-Monitoring	19	Adapted and modified from Pintrich and De Groot (1990)

The adapted questionnaire underwent expert review involving three validators addressing face, content, and language validity. The validators comprised an experienced TVET academic, an academic with expertise in TVET, educational technology, educational research, and instrument development, and a Bahasa Melayu language specialist. They reviewed the suitability, clarity, relevance, and linguistic appropriateness of the items in relation to the intended constructs and study context.

Following expert review, the instrument was pilot-tested with 33 Bachelor of Vocational Education students who were subsequently excluded from the main study. The results demonstrated satisfactory internal consistency, with Cronbach's alpha coefficients of .804 for digital information evaluation skills and .855 for self-monitoring (Table 2).

Table 2. Reliability Analysis of the Research Instrument

Construct	Cronbach's Alpha (α)	Interpretation
Digital Information Evaluation Skills	0.804	Good
Self-Monitoring	0.855	Good

No exploratory factor analysis (EFA) or confirmatory factor analysis (CFA) was conducted in the present study. Therefore, the dimensions and components described above should be interpreted as conceptually derived organisational domains rather than an empirically confirmed factorial structure. Future studies should examine the dimensional structure of the adapted measures using EFA and CFA.

Data Collection Procedure

Following approval from the relevant authorities, data were collected from eligible final-year ISMPV students at UTHM. The questionnaire was distributed both online and face-to-face using Google Forms and

QR codes. Participation was voluntary, and respondents were informed of the purpose of the study. Anonymity and confidentiality were maintained throughout the research process. A total of 186 usable responses were obtained for the main study. Because the available study records did not document the exact number of eligible students who received or accessed the survey invitation, an invitation-based response rate could not be calculated.

Data Analysis

Data were analysed using IBM SPSS Statistics Version 27. Descriptive statistics, including frequency, percentage, mean, and standard deviation, were used to summarise respondents' demographic characteristics and determine the levels of digital information evaluation skills and self-monitoring. Pearson's correlation coefficient (r) was used to examine the strength and direction of the association between digital information evaluation skills and self-monitoring. Mean scores were interpreted according to Ahmad (2002), while the strength of the correlation was interpreted based on Cohen (1988).

RESULTS AND DISCUSSION

As shown in Table 3, the analysis revealed a high level of Digital Information Evaluation Skills (M = 4.063, SD = 0.271). Ethics and Awareness in Digital Information Use recorded the highest mean score (M = 4.096), while Digital Information Analysis and Use obtained the lowest mean score (M = 4.011). The comparatively higher ethics and awareness score may be consistent with students' exposure to academic integrity, copyright, and responsible-use expectations during university study; however, the present cross-sectional data did not directly test the sources of this pattern. Likewise, although final-year students may have accumulated substantial experience with academic assignments and online learning activities, this study cannot determine whether such exposure caused the observed level of ethical information awareness.

This finding is consistent with Anthonysamy and Sivakumar (2024), who highlighted the role of digital information evaluation skills in identifying credible sources and minimising exposure to misinformation**.** Similarly, McGrew and Kohnen (2024) emphasised that evaluating information critically is essential for informed academic decision-making. Although Digital Information Analysis and Use recorded the lowest mean score, it remained within the high category. This may indicate that synthesising information from multiple digital sources requires more advanced cognitive and analytical skills than simply identifying credible information. This implies that TVET programmes should continue incorporating inquiry-based learning, authentic problem-solving activities, and information evaluation tasks that strengthen students' ability to critically analyse and apply digital information in professional contexts.

Table 3: Descriptive statistics of Digital Information Evaluation Skills by dimension

Dimension	**Mean**	**SD**	**Interpretation**
Digital Information Evaluation	4.080	0.322	High
Digital Information Analysis and Use	4.011	0.350	High
Ethics and Awareness in Digital Information Use	4.096	0.354	High
Overall	4.063	0.271	High

Level of Self-Monitoring among TVET Students, UTHM

Respondents reported a high level of self-monitoring. One possible interpretation is that final-year TVET study involves coursework, projects, and teaching practicum that require independent learning, time management, and reflection; however, these experiences were not tested as causal explanations in the present study. The relatively lower score for self-questioning may suggest that this particular metacognitive

strategy is less strongly reported than other monitoring behaviours, but further investigation would be required to explain why.

This finding aligns with Panadero (2017), who emphasised that self-monitoring is essential for evaluating learning progress and adjusting learning strategies. In a similar vein, Lim and Newby (2021) reported that effective self-regulation enables learners to adapt more successfully to technology-supported learning environments. Together, these studies highlight the importance of integrating reflective learning, self-assessment, and metacognitive activities to further strengthen students' self-regulated learning.

Table 4: Descriptive statistics of self-monitoring

Dimension	**Mean**	**SD**	**Interpretation**
Self-Monitoring	4.076	0.259	High

Relationship between Digital Information Evaluation Skills and Self-Monitoring among TVET Students, UTHM

A plausible interpretation is that the two competencies share metacognitive features: evaluating the credibility and relevance of digital information requires judgement and reflection, while self-monitoring involves checking one's understanding and learning progress. Nevertheless, the cross-sectional correlation does not establish directionality. Stronger self-monitoring could facilitate more careful evaluation of digital information, digital information evaluation could be associated with stronger self-monitoring, or both may reflect common underlying factors such as metacognitive ability, motivation, prior digital experience, or academic experience. These alternatives should be considered when interpreting the observed relationship.

This finding is consistent with Demirbag and Bahcivan (2021), who reported links among digital literacy, self-regulation, and epistemological beliefs, and with Anthonysamy et al. (2020), who identified an association between digital literacy and self-regulated learning strategies. Taken together, the present result and prior literature support a conceptual association between information-related digital competencies and self-regulated learning processes, but they do not demonstrate that strengthening one competency will necessarily improve the other. From a pedagogical perspective, TVET programmes may nevertheless consider integrating critical information-evaluation tasks alongside reflective and self-regulated learning activities, while future longitudinal or experimental research examines whether and how changes in these competencies are related over time.

Table 5: Pearson's correlation between Digital Information Evaluation Skills and Self-Monitoring

Variables	**r**	**Sig. (p)**	**Interpretation**
Digital Information Evaluation Skills and Self-Monitoring	0.584	< 0.001	Large positive correlation

CONCLUSION

This study found that the sampled final-year TVET students at Universiti Tun Hussein Onn Malaysia (UTHM) reported high levels of Digital Information Evaluation Skills and Self-Monitoring, with a statistically significant positive relationship between the two constructs ($r = 0.584$, $p < 0.001$). The findings provide institution-specific evidence that these competencies are associated in this sample; they should not be interpreted as demonstrating a causal effect or as statistically representative of all Malaysian TVET students.

The cross-sectional design does not establish temporal direction, and alternative explanations, including

shared metacognitive ability, motivation, prior digital experience, and other unmeasured factors, remain possible. Future research should involve multiple TVET institutions, clearer probability-based sampling where feasible, and longitudinal, mixed-method, or experimental designs to examine directionality, mechanisms, and generalisability. Further construct validation, including factorial evidence for the adapted instrument, would also strengthen future research.

Declarations

Author Contributions

Nur Syasa Amy Najwa Razali conceptualised the study, developed the conceptual framework, and formulated the research objectives and research questions. She conducted the literature review and contributed to data analysis, as well as the organisation and interpretation of the findings. She also contributed to the preparation of the manuscript.

Siti Noor Fauziah Abd Rahim supervised the overall research process and provided guidance on the study design, methodological approach, data analysis, and interpretation of the findings. She contributed to the critical review, refinement, and preparation of the manuscript for publication.

Both authors reviewed and approved the final version of the manuscript.

Funding

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

Conflict of Interest

The authors declare that they have no conflicts of interest concerning the research, authorship, or publication of this article.

ACKNOWLEDGEMENTS

The authors would like to express their sincere appreciation to Universiti Tun Hussein Onn Malaysia (UTHM) and the Faculty of Technical and Vocational Education for their support throughout the study. Special appreciation is extended to the final-year Bachelor of Vocational Education (ISMPV) students who participated in the research, as well as to all individuals who contributed to the successful completion of the study.

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