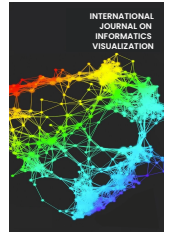




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Systematic Literature Review on Persuasive System Design Framework for Managing Curriculum Performance

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Abstract—Integrating digital resources into educational assessment has led to the widespread adoption of e-portfolios as tools for documenting and evaluating student achievement, thereby transforming traditional evaluation methods. However, the existing frameworks primarily focus on assessing academic performance, often neglecting the comprehensive monitoring of student's co-curricular activities. To overcome current gaps in comprehensive student evaluation, this study introduces a conceptual framework incorporating persuasive system design (PSD) into an e-portfolio to facilitate efficient co-curricular performance monitoring in Malaysian secondary schools. To ensure a thorough approach to educational evaluation, it is essential to effectively monitor and manage academic and extracurricular performance to understand student progress comprehensively. By adding Physical Activity, Sports, and Co-curriculum Assessment (PAJSK) – specific categories and key PSD elements- primary task support, dialogue support, system credibility support, and social support- that are all designed to improve user engagement and system dependability in an educational environment, the framework builds on the Oinas-Kukkonen and Harijumaa PSD Model. This study adapts and discusses the persuasive design elements to meet the goals of educational assessment frameworks by comparing PSD implementation in e-health, e-tourism, e-commerce, and e-learning. The results offer an overview of developing a practical, engaging e-portfolio framework that facilitates comprehensive student evaluation, especially in educational environments focusing on co-curricular achievement.

Keywords—e-Portfolio; education; persuasive system design; PSD

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I. INTRODUCTION

In the 21st century, global society faces significant changes, and the advancement of information and communication technologies (ICT) facilitates more integration and expedites the communication process [1]. The global COVID-19 pandemic, which emerged in 2020, has significantly changed many aspects of human life, including education [2]. The application of technology in student learning evaluation has emerged as an innovative approach, transforming traditional assessment methods into digital formats, with the e-portfolio serving as a prominent example. [3]. The traditional examination-oriented education system must adapt to globalization by incorporating information technology into teaching, learning, and evaluation. E-portfolio can be used for a variety of purposes, including

instructional performance, inspiring critical thinking, and advancing professional development [4]. Next, an e-portfolio provides teachers with the chance to reflect on their experiences and offer the examinee feedback as a result [4]. A kind of cooperative mentality helps the teachers to learn and advance as professionals because all the records of their performance and progress are up to date [4]. Educators have shown interest in the e-Portfolio, an academic innovation [5]. Compared to traditional portfolios, e-portfolios offer several benefits such as accessibility, simplicity in copying and storing, continuous updating, and the ability to incorporate audio and video content and hyperlinks for a more dynamic display of content [1].

Information system (IS) designs that have the potential to positively influence or negatively affect people's attitudes, behaviors, or decision-making are collectively referred to as

persuasive system design (PSD) [6]. PSD can increase users' motivation and engagement to change their attitudes, actions, or decisions in a positive way [6]. Today, persuasive technology can be used in a wide range of applications, including robotics, stand-alone programs, portable devices, web-based applications, computerized toys, and games [7]. However, studies have shown that this strategy could not work for persuasion because different user types are influenced by different persuasive techniques [8]. The potential for using information technology as a tool for persuasion has increased to the point where persuasion systems can operate smoothly and even subtly on the devices that people carry with them nearly all the time thanks to advancements in information systems, their interfaces, and ever-increasing connectivity [9]. Persuasive designs are sometimes visual objects meant to have a good or negative impact on people's actions. This can help them reach their goals and enhance their well-being [6].

Furthermore, one of the assessments available in the school-based assessment is the Physical Activity, Sports, and Co-curriculum Assessment (PAJSK). Teachers must interpret the five components of PAJSK. Sport or game, club, and uniformed (1M1S) [10]. Standard National Physical Fitness (SEGAK), Body Mass Index (BMI), athletics, co-curricular activities, and extracurricular activities comprise the PAJSK. The PAJSK is a tool for measuring physical activity involvement and evaluating health and physical activity, extracurriculars, co-curriculars, and sports. Unfortunately, due to the necessity of teaching while assessing students, teachers encounter an increasing administrative burden to complete, making teaching the primary goal more and more impossible. The burden of current teachers will increase even more with the implementation of PAJSK. Because of this, teachers lack the motivation to implement PAJSK. Unfortunately, maintaining teachers' engagement and motivation to use the PAJSK system effectively is one of the issues associated with using it for performance assessment. Based on previous studies, persuasive techniques such as rewards praise can improve motivation and engagement [11]; however, the way the user interface (UI) and the content are designed affects how effectively e-Portfolio is.

In addition, based on previous case studies, different techniques or features are needed due to the variety of student environments [12]. Not all behavioral changes are positive when utilizing e-learning systems with persuasive characteristics, as observed in studies on behavioral outcomes [12]. Next, students are prone to respond favorably to rewards other than competition, social comparison, and social learning strategies [13]. This indicates that the Reward techniques may be the most successful in inspiring students to study more or put in more effort [13]. Also, [14] stated that the working group came to the intriguing conclusion that methods like praise and rewards (both under dialogue support) need to be applied effectively to encourage intrinsic learning [14]. Furthermore, many types of system domains apply PSD, for example, e-Commerce, tourism, e-health, and e-Learning.

A. Persuasive System Design in e-Health

In recent years, persuasive design has become a crucial component of electronic health (eHealth) [15]. Persuasive technology aims to influence people's benefits and actions [6].

These automated Web-based health behaviors change programs may be inexpensive and widely applicable. [16]. Technology-based interventions for both physical and mental health have given rise to some terms, including computer-mediated interventions, online therapy, Web-based therapy, cybertherapy, digital therapy, e-therapy, e-health, e-interventions, and digital interventions [16]. e-health enhancing data gathering, spreading knowledge and awareness, conducting real-time remote telemonitoring, or more efficiently providing healthcare services [17]. One of example a persuasive game-based health initiative called *Rightway Café* uses competitiveness to encourage good eating and exercise [13]. To help their avatars achieve a healthy weight, users must control the everyday activities of their avatars, including calorie intake and physical activity [18]

B. Persuasive System Design in e-Tourism

Tourism has changed in step with technology, fundamentally altering both the travel business and how we see it [19]. Information and communication technologies (ICT) are gradually becoming more important in providing the tourism industry an edge over its competitors, which changes how travelers behave and the tourism sector [19]. In addition, e-Tourism is digitalizing all travel, tourist, hospitality, and catering industry operations and value chains to enhance organizational performance and efficiency [19]. Moreover, e-tourism destinations should be innovative and engaging and enhance the overall travel experience for all visitors [19].

C. Persuasive System Design in e-Commerce

Building an online store or business website is now simpler than ever. For businesses of all sizes, from startups to industry titans in this new digital age, having a website is essential to their expansion. [20]. e-Commerce it engages users and offers helpful content to draw in prospective clients [20]. E-commerce implies that a user's motive for shopping can predict whether they would purchase the product [21]. Enhancing e-commerce applications' persuasiveness can be achieved by assisting users in approaching the desired behavior and lowering the effort needed [22]. Also, in e-commerce, persuasive design may be quite helpful in boosting sales and retaining customers [22]. In addition, a digital catalog is a fantastic example of a persuasive tool that can be used in e-commerce to influence customer demands and inform special offers and promotions [23].

D. Persuasive System Design in e-Learning

E-learning is a platform or medium that offers educational functions like tracking student progress and distributing training materials and activities [24]. The most recent e-learning shift from a centralized, traditional education system to an interactive, communicative online learning system is supported by the development of Web 2.0 technologies [12]. [11] suggests defining a persuasive educational system (PES) as an interactive system created for a learning environment that enables students to develop, modify, or reinforce the best attitudes or behaviors for learning with persuasive tactics. Since technology gives students individualized and personalized links that enhance real-time involvement, [11] views this as an enormous contribution. Another famous e-

learning platform is Edmodo. Edmodo can improve learning process effectiveness, boost student participation, and include multimedia in the teaching and learning process [25].

Using e-portfolios in school can help teachers manage students' performance effectively, especially for co-curricular performance. The purpose of this research is to develop a conceptual framework. The results can enhance student performance and help develop a more effective e-portfolio for education.

This study aims to provide a thorough framework for managing school portfolios that uses Persuasive System Design (PSD) principles. Through PSD integration, the framework aims to improve overall student performance management, especially in co-curricular activities, increase teacher engagement, and simplify assessment procedures. In the 21st century, applying technology to evaluate student learning has emerged as an innovative method for converting traditional assessment into digital assessment; an e-portfolio is one of the digital assessments. Why it is vital to apply PSD because it can increase users' motivation and engagement to change their attitudes, actions, or decisions in a positive way [6] also [26] stated that PSD encourages users to keep user use the apps. A better e-portfolio system that could have an impact and guarantee its efficacy would remain a fantasy without proper planning and study. Without meticulous planning and research, a better e-portfolio framework might make a difference and ensure its effectiveness would stay a fantasy.

Several difficulties are associated with the Physical Activity, Sports, and Co-curriculum Assessment (PAJSK) system as it is now implemented in Malaysian schools, especially for the teachers responsible for evaluating their students' extracurricular activities. The PAJSK evaluation encompasses various elements, such as co-curricular activities, sports, clubs, uniformed units, body mass index (BMI), and standard national physical fitness (SEGAK). These components together put a significant administrative load on teachers. Consequently, teachers encounter excessive work, juggling teaching and administrative responsibilities, reducing their ability to focus on teaching.

Findings from previous studies show that the proposed framework must be applied properly to encourage intrinsic learning. Previous studies have indicated that implementing a teaching protocol that supports the integration of many components may enhance students' motivation to participate actively in online learning [14]. Next, it can be challenging to determine who is most likely to be motivated by specific PSD methods [14].

To the best of our knowledge, there is a lack of a framework that combines persuasive design concepts with the development of an e-portfolio system tailored to co-curricular performance. Thus, this offers an effort to provide a conceptual framework for a co-curricular performance management system that uses a persuasive design approach. The persuasive design approach for this research has chosen the model by [27], which consists of categories: primary task support, dialogue support, system credibility support, and social support

A well-designed e-portfolio system might still be ineffective if persuasive design concepts are not used. Teachers can make the system more interesting, motivating,

and fulfilling by applying compelling design concepts. Implementing strategies like reduction and simulation can also keep teachers' attention and encourage them to continue using e-portfolio systems.

The new framework this study proposed could lead to the creation of a more effective e-portfolio system tailored to co-curricular performance. The framework incorporates a persuasive model by [27]: primary task support, dialogue support, system credibility support, and social support. According to the study's authors, this framework might be utilized to create e-portfolio systems that are more engaging, motivating, and satisfying for both teachers and students.

There are three objectives of this paper. Firstly, it aims to investigate and evaluate current portfolio management system design approaches in educational settings. Secondly, it seeks essential elements and techniques from the current PSD model that can be adapted for school portfolio management, especially for co-curricular performances. Third, this paper proposes a conceptual PSD framework for managing school portfolios by synthesizing insights from other studies. A thorough analysis of literature published between 2010 and 2024 is part of this paper's scope to make sure the result represents the most recent developments and trends in PSD applications. The review will focus on empirical research, theoretical papers, case studies, and reviews that address PSD frameworks in educational tools- particularly e-portfolio systems. Opinion pieces and non-peer-reviewed articles will not be accepted.

A clear organizational structure is used in the paper to help readers comprehend the material. The systematic review's methodology is fully described in the methodology section, including the keywords to be searched, the selection and exclusion criteria, the guiding research questions, and the quality evaluation parameters for the chosen articles. Building on this foundation, the "Results" section painstakingly breaks down the selection procedure and provides findings consistent with the predetermined study topics. The technological fundamentals, quality results, and key findings (including the scope, achievements, limitations, and future directions) of each study are covered in detail in this part. The findings are then thoroughly examined in the "Discussion" section, highlighting new developments, knowledge gaps, potential limitations, and opportunities in using e-portfolios for education, particularly in co-curricular activities. Lastly, the "Conclusion" section provides insightful information to direct future research efforts in this field and essentially summarizes the key conclusions of the systematic review.

II. MATERIALS AND METHOD

To identify the key characteristics of e-portfolio applications in education and assess their potential for effective integration into various aspects of the learning process, a comprehensive review of the literature published between 2010 and 2024 was undertaken. Mapping the body of knowledge about PSD in the domains of e-health, e-commerce, e-tourism, and education was the main goal of the search. We developed a search strategy to locate relevant data for this comprehensive search. Using keywords, this specific search strategy was created for datasets such as Scopus, Google Scholar, Web of Science, IEEEExplore, and Science Direct and was used to find scientific articles:

- “e-Portfolio” AND “Education”
- “Persuasive System Design” AND “Education”

Key databases were discovered through a rigorous selection process guided by comprehensiveness, interdisciplinary, publishing quality, global inclusivity, and user access standards. These databases provide access to peer-reviewed literature and conference proceedings from various academic disciplines, guaranteeing a solid and comprehensive basis for study on e-Portfolio system design. By incorporating Google Scholar, the research is extended to open-access sources, and its renowned reputation, multidisciplinary perspectives, and sophisticated search capabilities further help an exhaustive and trustworthy examination of the topic. The curated database is renowned for its regular and prompt updates. Ensure that the most recent research is included and that the review keeps up to speed with the rapidly evolving field of Persuasive System Design in education. The inclusion/exclusion criteria are listed below; data collecting started in April 2024.

A. Selection Criteria

- Articles that discuss the design of the e-Portfolio systems
- Articles published between 2010 until 2024
- Journal and conferences
- Published in English and Malay language

B. Exclusive Criteria

This review did not include reviews, summaries, workshop and lecture notes, and other types of research investigations. Additionally, studies that do not focus on PSD or education will not be included.

III. RESULTS AND DISCUSSION

Following the guidelines provided by the Preferred Reporting Items for Systematic Review and Meta-Analysis (PRISMA) statement, Figure 1 shows the inclusion and exclusion of literature at each stage [28]. PRISMA stands for revised. Globally accepted version of the QUORUM (Quality of Reporting of Meta-analysis) statement. This study presents the basic stages of the method.

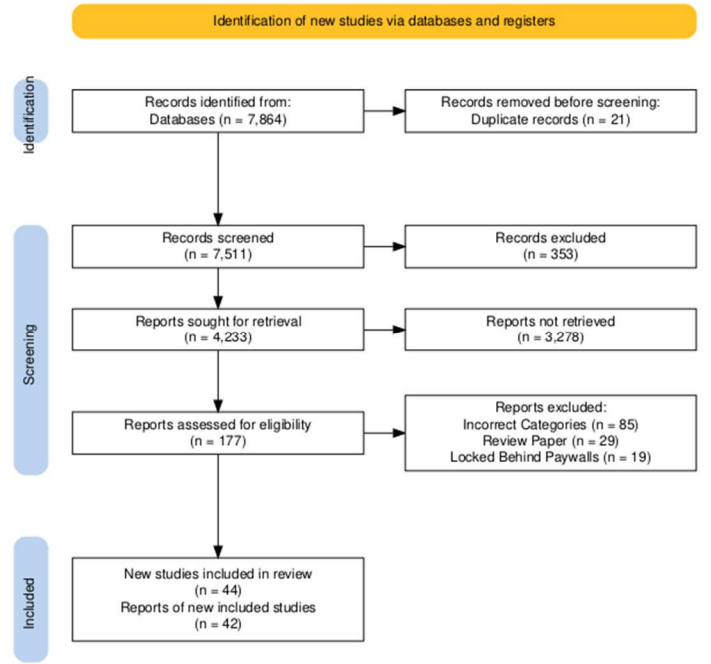


Fig. 1 Prisma Flowchart

Initially, 7864 relevant publications were identified during the first phase of the investigation. Data refining was then carried out, which involved a few sequential steps. The dataset was further enhanced after a preliminary data cleansing stage by excluding non-English publications and duplicate entries, resulting in 7511 articles overall. A comprehensive screening of the titles and abstracts of these publications was performed, resulting in 4233 potentially relevant papers for further evaluation. Furthermore, the number of publications was reduced to 184 after further articles were unavailable through the recognized channels, and those classified as reviews or theoretical works unrelated to the research issue were eliminated. After strict inclusion criteria were applied, a final set of 44 studies was selected for in-depth analysis. A thorough visual representation of the workflow is provided in Figure 1. The Google trend search volume for “e-Portfolio” is shown in Figure 2, which provides insight into the public’s interest in this topic.

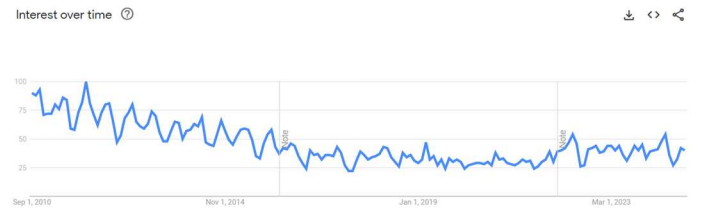


Fig. 2 Google Trends for Keyword "e-Portfolio" from 2010-2024

TABLE I
REVIEW OF THE PREVIOUS LITERATURE

ID	Author	Domain	Key Findings	PSD Principle Applied	Performance Measurement
1	[2]	e-Learning	Created a web-based counseling tool to facilitate student's distant access to psychological assistance	None	Questionnaire surveys
2	[3]	e-Learning	Most teachers concurred that more training and materials were required to enhance the use of e-portfolios in classroom evaluation.	None	Quantitative surveys
3	[4]	e-Learning	Student teacher's abilities, knowledge, and self-reflection are enhanced via e-Portfolios.	None	Mixed-mode method and survey
4	[5]	e-Learning	Proposed a ten-part e-Portfolio approach that included student biographies.	None	Descriptive and experimental
5	[6]	Multiple domain	Six ethical design guidelines were suggested to help people utilize persuasive technology responsibly.	Gamification	Literature analysis and qualitative interviews
6	[7]	General domain	Highlighted how crucial user experience is to persuasive systems.	Self-monitoring, reminder, suggestion, and collaboration	Conceptual framework
7	[8]	e-Health	Persuasive tactics have various impact on different types.	Gamification	Structural equation modelling (SEM)
8	[9]	e-Health	Understanding user attitudes and self-perception is necessary for effective customization, increasing communications' relevance.	Self-monitoring and feedback	Systematic literature review
9	[10]	e-Learning	The instructor demonstrated a modest level of preparedness, expertise, and proficiency in putting PAJSK into practice.	None	Descriptive statistic
10	[11]	e-Learning	Identified seven essential elements for creating appealing educational systems, with a focus on gamification and tailored persuasion.	Rewards, competition, and personalization.	Systematic review literature
11	[12]	e-Learning	Persuasive techniques combined with Web 2.0 features enhanced user engagement and learning behavior.	Self-monitoring, personalization, feedback, and reminders.	Surveys
12	[13]	e-Health	Although social-oriented tactics work well for changing behavior, they can also backfire by creating stress, privacy issues, and demotivation.	Competition, social comparison, and cooperation.	Thematic analysis and quantitative surveys
13	[14]	e-Learning	Emphasized how crucial it is to balance using technology and engaging in reflection in learning environments.	Self-monitoring, personalization, praise, and reminders.	Qualitative feedback
14	[15]	e-Health	Higher engagement is associated with intrinsic motivation; tactics must be customized according to each type of motivation.	Self-monitoring, reminders, feedback and goal setting,	Surveys
15	[16]	e-Health	Emphasized that to improve user engagement, tailored content must be appropriately integrated.	Reduction., self-monitoring, tailoring and reminders.	Expert evaluation
16	[17]	e-Health	For children with cancer and their care, mHealth helps with information sharing, self-monitoring, and symptom management.	Self-monitoring, reminders, and rewards.	Pilot studies, feedback, usability assessment.
17	[19]	e-Tourism	Systems combine socio-cultural, economic, and environmental factors to contribute to a more personalized travel experience and sustainable tourism.	Personalization	Evaluation metrics
18	[20]	e-Commerce	By making user actions simpler, persuasive design increases conversion rates.	Personalization, reminder, and rewards.	Expert evaluation
19	[21]	e-Commerce	Different persuasive techniques work for different kinds of shoppers.	Scarcity, authority, liking, and reciprocity.	Partial Least Square Structural Equation Modelling (PLS-SEM)
20	[22]	e-Commerce	Recommendation centered on enhancing the incorporation of underutilized persuasive techniques such as verifiability and authority.	Self-monitoring, tailoring, feedback and cooperation.	Expert Evaluation

21	[23]	e-Commerce	The most significant impact on user acceptance and online purchasing behavior was dialogue support.	Reminders, rewards, trustworthiness, and comparison.	Surveys
22	[24]	e-Learning	Good LMS interfaces can reduce problems like procrastination and increase engagement.	Self-monitoring, tailoring, and reminders.	Heuristic Inspection and expert evaluation
22	[26]	e-Health	Better incorporation of adaptive reminders and social support were among the design enhancement suggestions.	Self-monitoring, personalization, reminder, and reward.	Surveys
23	[27]	General Framework	Presented the PSD model, which consists of four categories and 28 techniques.	Reduction, self-monitoring, reminders, suggestion, etc.	Conceptual framework
24	[29]	e-Health	While collectivist users like reminders, individual users favor self-monitoring.	Self-monitoring, reminders, goal setting.	Qualitative approach
25	[30]	e-Learning	Elements of gamification improve learner engagement and motivation.	Gamification	Systematic review literature
26	[31]	e-Learning	Discovered that the efficacy of persuasive systems is impacted by technological accessibility.	None	Mixed method (survey and statistical analysis)
27	[32]	Multiple domain	The study shows the importance of credibility, social support, and dialogue support in preserving user engagement	Reminder, feedback, and goal setting.	Structural equation modeling
28	[33]	e-Learning	The most successful strategies were determined to be reward-based and social comparison.	Rewards, social comparison, and competition.	Surveys
29	[34]	e-Health	The most often employed persuasive strategy was self-monitoring reminders, comparison, and rewards.	Self-monitoring, reminders, reward, social comparison, and competition	Systematic review
30	[35]	e-Learning	Edmodo greatly enhanced student's attitudes towards online learning and their learning abilities.	Self-monitoring, social interaction, and reminders.	Experimental.
31	[36]	e-Health	According to the study, if adherence is maintained, minor, customized lifestyle adjustments can result in steady weight loss.	Self-monitoring, reminders, and tailored	Surveys
32	[37]	e-Tourism	Found that visual design is crucial to persuasion on tourism websites.	Six Cialdini principles.	Conceptual analysis
33	[38]	e-Learning	Most curriculum lacks database management.	None	Surveys
34	[39]	Database management	Sustaining good performance and data integrity required careful setup and optimization.	None	User feedback, response time, and monitor
35	[40]	RFID and IOT	IoT and RFID-based digital management systems were implemented to enhance real-time monitoring and process.	None	Simulation
36	[41]	e-Learning	Identified trends in student behavior across hybrid, online, and on-campus modes using big data approaches.	None	Analysis of LMS data
37	[42]	General Framework	Introduces the model that offers a methodical way to comprehend and plan for behavior change.	Fogg's PSD Model	None
38	[43]	General Framework	It was shown that reciprocity and commitment had the most significant impact.	Six Cialdini PSD Principles	Survey
39	[44]	e-Health	By offering a methodical approach, tunneling is a successful technique for assisting people in changing their behavior.	Tunneling, self-monitoring, reminders, goal-setting, and social support	Systematic Review
40	[45]	Online Interactions	In online interactions, reciprocity is essential for mutual recognition and fortifying social bonds.	Reciprocity	Conceptual analysis
41	[46]	e-Learning	Create a blockchain-based system that improves portfolio assessment.	None	Functional and comparative tests
42	[47]	e-Health	Determined the essential elements of persuasive design that help iCBT programs successfully lower anxiety.	Self-monitoring, simulation, personalization and social learning	Realist synthesis and meta-analysis

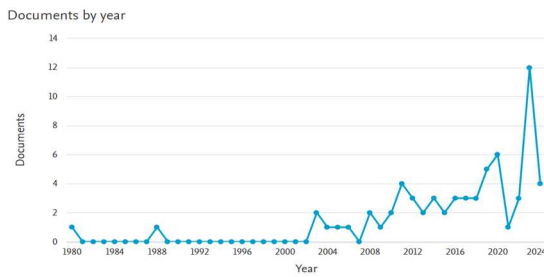


Fig. 3 Research paper by year under Persuasive in education and curriculum keyword

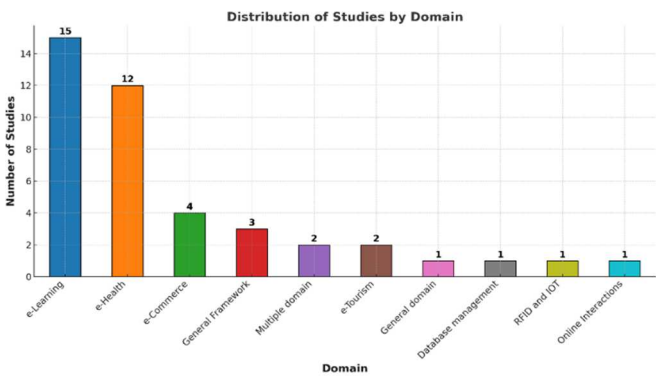


Fig. 4 Research paper by domain

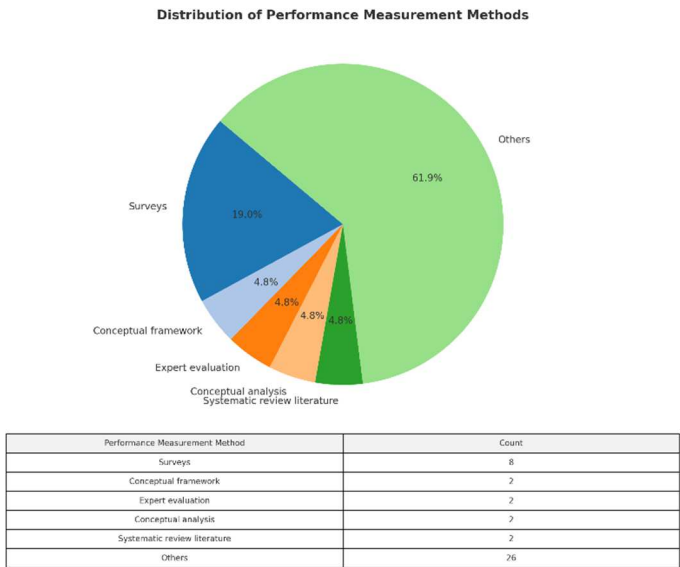


Fig. 5 Research Performance Measurement

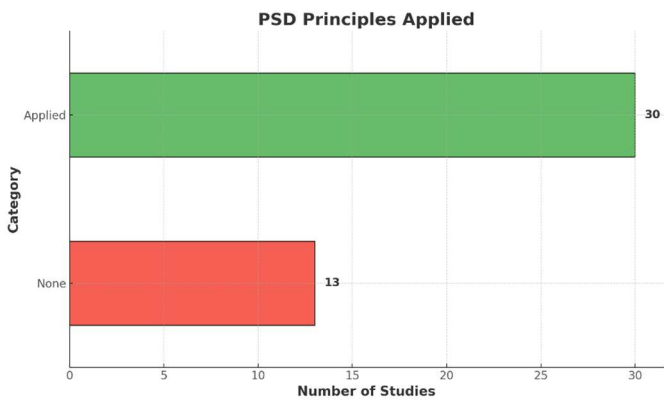


Fig. 6 PSD Principle Applied

The PRISMA standards were followed in this study, providing a methodical and open procedure for the inclusion and exclusion of literature. The process was meticulous, began with 7864 pertinent papers, and proceeded through several phases of data refinement. The collection of papers was reduced to 37 for in-depth analysis by applying strict inclusion criteria, cleaning the data, and screening the results. This meticulous procedure ensures that the chosen literature fully addresses the research objectives and improves findings validity. The analysis of Google Trends data, which tracks the term “e-Portfolio” from 2010 to 2024, sheds light on how public interest in this topic has changed. This information highlights e-portfolios’ expanding significance and points to a growing understanding of their potential advantages in both professional and educational contexts. These findings are important because they show how much study is needed in this field to address the potential problems related to adopting e-portfolios.

Key findings from the review of previous research were found in various fields, including general frameworks, e-health, e-learning, e-tourism, and e-commerce. Several PSD principles were prevalent in various domains, including self-monitoring, reminders, personalization, and gamification. Depending on the situation, these principles are applied differently, demonstrating the flexibility and adaptability of persuasive strategies. In health-related applications, for example, self-monitoring and reminders are standard and encourage behavior change through consistent reinforcement and feedback. On the other hand, gamification elements were more frequently applied in educational contexts, where they enhanced motivation and engagement. These insights provide a basis for comprehending how PSD principles can be incorporated into other systems, guiding the creation of a more comprehensive and flexible framework.

Additionally, this paper emphasized the variety of performance measurements used to assess persuasive systems, such as statistical analysis like structural equation modeling (SEM), heuristic inspections, and qualitative approaches. There is no one-size-fits-all method for determining the efficacy of persuasive technologies, as seen by the diversity of evaluation mythologies. The significance of the suggested framework in this study is further highlighted by this observation, which points to the necessity for flexible yet standardized assessment criteria that can be modified for use in various settings.

Several pre-existing frameworks were studied to find out how they combine pedagogy, content, and technology to improve learning and engagement. A complete framework that integrates instructional techniques, subject knowledge, and technology tools is the technology Pedagogical and Content Knowledge (TPACK) framework [48]. It highlights how Web 2.0 technologies can facilitate a range of cognitive functions and provides educators with helpful advice on successfully incorporating technology into their lesson plans. An example of another framework that focuses on persuasive technology is “Enabling Young Individuals to Make an Informed Decision about Higher Education” [49]. This framework illustrates how persuasive design can influence decision-making behavior by engaging users through interactive narratives and gamification.

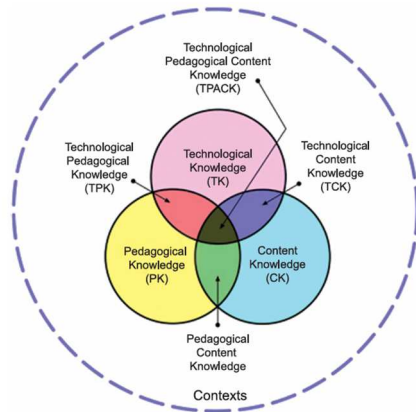


Fig. 7 Technological Pedagogical and Content Knowledge (TPACK)

Similarly, the Digital Media Literacies Framework strongly emphasizes developing abilities in the conceptual, functional, and audio-visual domains so that students may produce useful digital media artifacts [50]. Meanwhile, the Trauma-Informed Framework focuses on developing supportive learning environments and takes a multi-tiered approach to meeting student's psychological and emotional needs [51]. Finally, the Conceptual Design and Evaluation Framework for Mobile Persuasive Health Technologies provides a measurable and user-centered method for creating persuasive health applications, which combines the PSD model with usability considerations [52].

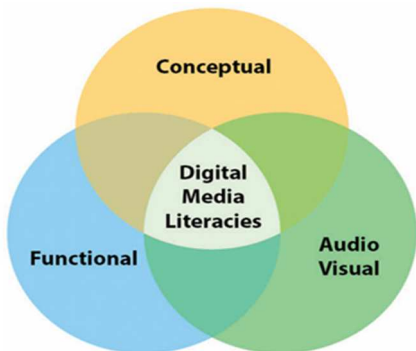


Fig. 8 Digital Media Literacies Framework

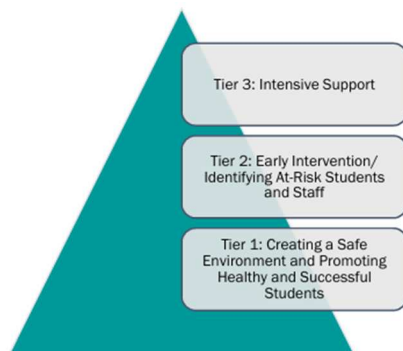


Fig. 9 Trauma-Informed Framework

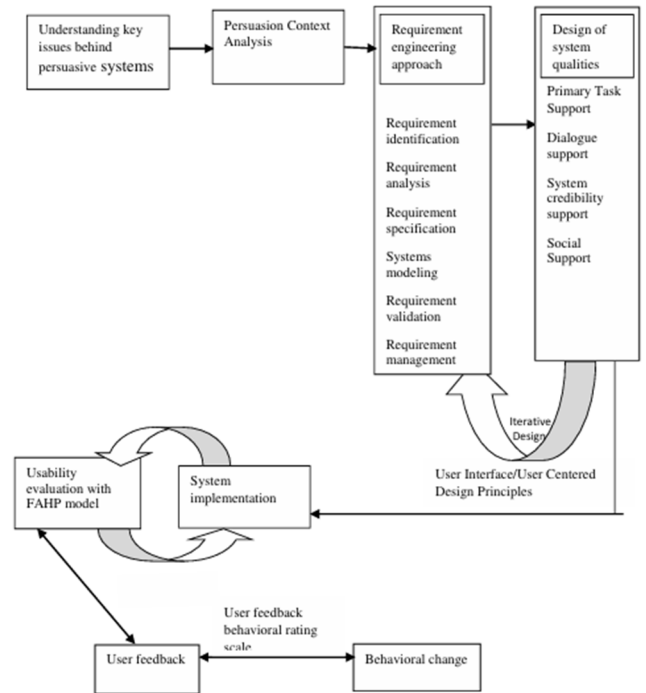


Fig.10 A Conceptual Design and Evaluation Framework for Mobile Persuasive Health Technologies (Usability Approach)

Although each framework offers insightful information, their strengths vary depending on the context. While the persuasive technology framework emphasizes the motivational components that influence user decision-making processes, the TPACK framework is particularly effective in academic contexts due to its adaptability to emerging technologies and its focus on aligning pedagogical strategies with learning objectives. But by bridging the gap between theoretical design and real-world usability, the usability-centric health technology framework highlights the significance of quantitative metrics for evaluating the efficacy of a persuasive system.

A. Research Gap

While e-portfolio systems are widely acknowledged as instruments for evaluating academic performance, a substantial research gap exists concerning their use in monitoring extracurricular activities, especially in Malaysian secondary schools. Co-curricular activities like clubs and sports are under-represented in current literature because they mainly focus on academic evaluations. Furthermore, engaging design elements that raise user motivation and engagement are often missing from current e-portfolio systems. Teachers in charge of evaluating extracurricular activities thus encounter difficulties, such as task overload and a decline in motivation because of the lack of elements that maintain their interest and promote consistent system use.

While integrating technology with pedagogy is a priority of the current framework, such as TPACK, co-curricular performance management is not expressly addressed. Like this, [19] PSD model has been successfully used in health technology, but its application in educational settings—especially for e-portfolios—remains limited. Other frameworks, such as those that emphasize Digital Media Literacy or Trauma-Informed approaches, provide insightful viewpoints. Still, they fall short in addressing the behavioral

and motivational elements that could encourage regular usage of e-portfolios for extracurricular evaluations.

B. Proposed Conceptual Framework

This paper suggested a conceptual framework based on the PSD framework that has been modified to fit the unique requirements of secondary schools in Malaysia and address these gaps. The PSD model core categories- primary task support, dialogue support, system credibility support, and social support-are integrated into the framework and added components specifically designed for the educational environment, especially the PAJSK categories (SEGAK, Curriculum, and extra-curricular).

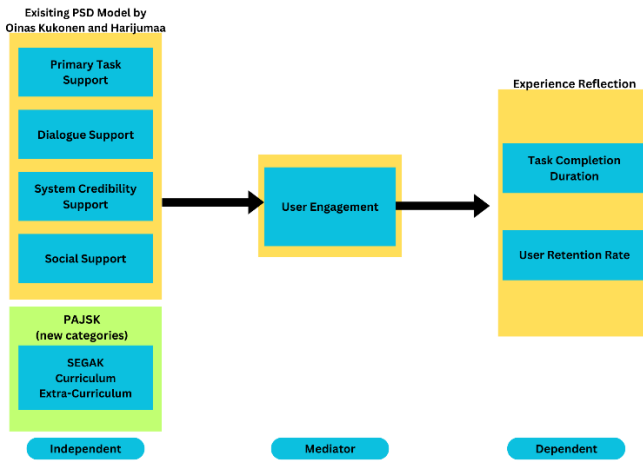


Fig. 11 Conceptual Framework of Persuasive System Design for e-Portfolio System

The proposed framework acknowledges that teacher active participation is essential to the system's efficacy and emphasizes user engagement as a mediator variable. Adding PAJSK categories makes the system more relevant and comprehensive, evaluating a wider range of student accomplishments. Performance metrics like task completion time and user retention rates will be used to evaluate the framework's effectiveness. The framework encourages sustained engagement by incorporating PSD elements with the PAJSK structure. This will ensure that teachers are encouraged to utilize the system regularly, increasing the overall effectiveness of co-curricular performance management.

IV. CONCLUSION

In conclusion, this paper underscores the need for a more comprehensive e-Portfolio framework that integrates persuasive design principles to manage co-curricular performance in Malaysian secondary schools effectively. Existing frameworks focus on academic evaluation, leaving a gap in assessing co-curricular performance. To encompass a greater spectrum of student accomplishments, the suggested framework changes the PSD model from [19], like primary task support, dialogue support, system credibility support, social support, and lastly, new categories added is PAJSK. This framework seeks to assist teachers in streamlining assessment and optimizing the general administration of extracurricular activities by increasing user engagement and motivation.

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