ONLINE JOURNAL FOR TVET PRACTITIONERS
e-ISSN: 2289-7410

OJ-TP

Vol. 10 No. 1 (2025) 62-68
https://publisher.uthm.edu.my/ojs/index.php/oj-tp

Personal Learning Environments (PLE) Among Malaysian Students

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DOI: https://doi.org/10.30880/ojtp.2025.10.01.006

Article Info

Received: 24 December 2024
Accepted: 17 March 2025
Available online: 31 March 2025

Keywords

Personal Learning Environment (PLE), self-concept, planning and management, tool and resource and socialisation

Abstract

The paper aims to explore the correlations between Malaysian students Personal Learning Environments PLE in terms of four significant factors; self-concept, planning and management, tool & resource utilization as well as social interaction. The emphasis is on variances such as age, gender and wealth. Out of 198 students aged 13 to 17, the data indicated that 66.2% scored "High" in social interaction, with similar numbers for use of tools and resources (72.7%), planning and management (80.8%), and self-concept (84.8%). These qualities are only very slightly correlated with age, as older students generally perform better. To take one example, 92% of the solenoid needed for 17-year-olds were scored as "High" in Self-Concept than just 70% of those solenoid needed for 13-year-olds. Gender Differences: In all dimensions, women outperform men and employ Planning Tools and group learning effectively with PLE tools. Limitations such as limited access to technology compound wealth disparities, meaning many lower-income students experience very different patterns of social interaction and resource utilization. Our findings highlight the need for inclusive PLE designs and targeted interventions, such as equitable access to digital devices and tools; gender-sensitive design features, and personalised supports—if PLE benefits are to be maximised for diverse learner populations.

1. Introduction

The concept of Personal Learning Environments (PLE) focused on personalised, learner-cantered approaches to learning, it has emerged over the last few years as a principal trend in modern education. Personalized learning environments (PLE) are evolving frameworks where digital tools and platforms are integrated to provide students with more autonomy in their learning (IEEE Educational Society, 2024). According to Rahimi et al. (2015), these settings enable students to set goals, allocate resources, and engage meaningfully with teachers and peers. Indeed, the rise of PLE is a reflection of their newly found importance in nurturing self-directed and active learning, particularly in adapting to rapidly evolving educational contexts (Kop & Hill, 2023).

COVID-19 has driven the transition to online and hybrid learning, revealing both the unique challenges PLEs face as well as their transformative potential. The studies performed in this timeframe demonstrated that PLE fostered students to take control of their learning environments by offering them instruments for task

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management, resource organization, and academic goal pursuit (Smith et al., 2021). In addition, as they were considered essential for the effective use of PLEs, the pandemic amplified calls to action for digital literacy and equitable access to technology (Malamed & McCarthy, 2023). Teachers considering the use of PLE are motivated by the proof of increased self-awareness in their students and its invention towards goal setting as well as social and academic collaboration (Rahimi & Veen, 2020). You can realize this kind of advantage more when PLEs are personalized for learners to overcome challenges and develop essential skills for solving problems.

This study aims to analyze the usage of PLE by Malaysian students, particularly instrumental use as a predictor of academic performance and psychological well-being aspect. This research focuses on strategies and approaches that help to find practices in organizations through utilizing elements of Personal Learning Environment (PLE) including self-development, strategy and planning, resource management, and socialization support PLE. The results will provide valuable information for developing policies and initiatives supporting all students in an evolving digital educational landscape.

1.1 Research Objectives

1. To find out the existence of Factors of PLE among the students and information about the quality of PLE
    - Factor 1. Self-concept of the learning process (SC)
    - Factor 2. Planning and management of learning (PM)
    - Factor 3. Use of resources and tools (RT)
    - Factor 4. Communication and social interaction (and linguistic ability) (SI)
2. To assess the correlation between the use of PLEs and their psychological well-being level.

The last five years have witnessed substantial academic interest in Personal Learning Environments (PLE); the approach has been identified as possibly transformative for education by promoting student ownership and participation Looking ahead to next season According to Rahimi et al. PLEs are designed to include digital tools, platforms and resources to enable learners take control of their learning independently (Aïmeur, 2015). Constructivist theories highlight learner-centred approaches, because they allow students to customise their learning processes according to their own goals, preferences, and situations. This study discusses some of the key issues that exist in current literature, such as social interaction, planning and management, self-concept and resource investment within PLE frameworks.

2. Literature Review

2.1 Self-Concept and PLE

Self-concept is an essential aspect of PLEs in the terms of students awareness and self-esteem about learning. Studies highlight the importance of developing a positive self-concept as a tool for improving academic outcomes (Jeske and Rodman, 2024). Rahimi and Veen (2020) for example, stated that students who manage their own learning can perform self-reflection and self-control, which are important parts of the development of self-efficacy through PLEs. Moreover, studies show that young learners benefit from a guided customisation of their PLEs to recognise what they do well and how they need assistance (Smith et al., 2021), so self-concept may be especially important (Hall & Tashakkori, 2020).

2.2 Planning, Management, and Goal-Setting

A different part wherever PLEs possess demonstrated satisfactory benefits is within their ability to program and manage learning effectively. To help students organise their tasks and manage time, a PLE provides them with digital agendas, goal-setting tools and collaborative platforms. The researchers found that students who were exposed to PLEs set both short- and long-term goals and demonstrated better prioritization of tasks (Chen & Patel, 2022; Lim & Newby, 2023). Our findings align with previous research that points to conducive PLE planning and management improving academic stress and resilience for students transitioning to remote or hybrid learning settings during the pandemic (Rahimi et al, 2020).

2.3 Resource Utilization and Technological Literacy

Recently, one of the most frequent topics has been what various resources and digital tools are used PLE. Research has shown the potential of PLE in enhancing students' digital literacy and their ability to curate and synthesise content stringed together. Smith et al. Students who are offered well-design Personal Learning Environment (PLE) can improve their level of exploration in learning with forms of collaboration tools such as blogs and forums,

multimedia, etc., (Smith et al., 2021). Still, the full power of PLE particularly in poorer communities is limited by issues such as inequitable access to technology and the digital divide.

2.4 Social Interaction and Collaboration

PLE also plays a significant role in promoting the collaboration and social engagement of students. Providing a platform for academic discussions, peer-to-peer support, and cultural exchange they develop communication skills and encourage global citizenship. Recent studies (Lee & Wong, 2023) showed that students who engineered PLE felt better connected with their fellow students and more engaged in the community. Their inclusion during the epidemic also underscored the important role that PLE can play in mitigating social isolation, as PLE offered virtual spaces for collaboration and connection precisely when face-to-face opportunities were limited (Springer & West, 2024).

The different research studies also indicated that PLE can enhance the social interaction among students, usage of learning resources, planning and management capabilities as well as self-concept. These findings illustrate the need to continue training and investment in technology to ensure equitable access to PLE, as well as maximizing their effectiveness across different learner populations. The post Future studies should investigate the long-term effects of PLE upon academic success and mental health, particularly in multicultural & resource poor schooling contexts.

3. Methodology

This study implements methodology to find out Malaysian student usages of Personal Learning Environment (PLE). A quantitative data gathering methodology is used. Four key domains assessed in standardized questionnaires:

- Self-concept
- Planning and Management
- Tools and Resources
- Social Interaction

Response 198 Malaysian students aged 13 to 17 years of age serve as respondents, ensuring a large diversity in representation in terms of age groups, socioeconomic status and sex. Surveys also measure psychological well-being to explore potential connections with PLE use.

4. Findings

4.1 Data Analysis and Discussion

In this research, researchers use descriptive statistics (frequencies, mean score, and standard deviation) to provide an overview of the object under study through the data that has been collected. In this case, descriptive statistics assist researchers in analyzing research questions 1 to 4.

4.1.1 Analyze of the effectiveness of the Merdeka curriculum by its context

The four PLE factors; Self-Concept, Planning and Management, Use of Tools and Resources as illustrated in table 1 with contribution frequencies data and variables about participants background such amount of age, gender, income are most significant between groups based confirming these general findings on correlation strength by Taylor (1990). An Eta value of $\eta_{SC(a)2} = 0.201$ for self-concept (as indicated in Table1) implies moderately weak association with age, whereby older students are somewhat more aware of themselves and their ability to learn effectively. The frequency statistics show that 84.8% of students were "High" on this item, with older pupils being responsible for a large majority of these scores (Rahimi et al., 2020). For example, in the context of PLE tools as self-reflections modules, it has been shown that over the gradual introduction to these tools can improve self-concept. Gender differences show women are achieving better, probably due to their higher use of reflective learning strategies (Sun and Xu 2024). Money affects self-concept too. People from wealthier households have more access to resources and techniques that facilitate self-awareness (Smith et al., 2021; Lee & Wong, 2023)

Planning and management age (Table 1) are also weakly related to it, though its Eta is somewhat small too at $\eta_{PM(a)}{}^2 = 0.178$. While older students scored better at 89% "High" at 17, this demonstrates that practice and experience, and not age alone, enhance planning abilities. The PLE as a system appears to be better utilized by older students, the data shows on the results, older students utilize resources within the framework of the PLE such as goal-setting software pieces and digital planners salvage (Chen and Patel, 2022). Based on frequency statistics, the maximum 80.8% students gained a "High" score; female students scored higher than male students

that is suggestive of both their use of organizational tools pro-actively, and social expectations (Rahimi et al., 2020). Such inequality greatly impairs planning abilities because less affluent students often simply do not have access to sophisticated resources (Smith et al., 2021).

There is almost negligible effect ($\eta_{RT(a)2}$ = 0.138 for Use of technologies and Resources on Table 1 of age on competence with digital technologies, this suggests that access to, and practice with technologies performances a more important role than simply age. In terms of frequency statistics, 72.7% scored a "High," as older students used the resources more effectively due to having had more years utilizing technology (Berbel Gimenez & Borras-Gene, 2023). Women performed slightly better than men, and utilised digital technologies more creatively for both academic and collaborative purposes (Sun & Xu, 2024). However, economics plays a heavy role on this aspect, as low-income students face barriers such as limited access to devices and the internet (Lee & Wong, 2023).

Social interaction demonstrates the least impact and has the lowest Eta $\eta_{SI(a)2}$ = 0.083 meaning a very low association with age. As shown in the frequency statistics of Table 1, a "High" was obtained by 66.2% of students, while female and older students performed better in using PLE tools on communication and teamwork. By Xu and Suns (2024) main finding at the national level, that women tend to do better in teams compared to men, it shows a strong gender difference. Income inequities are obvious when realizing that students with higher incomes have access to a wider range of social and cultural activities (Berbel Gimenez & Borras-Gene, 2023). Teaching tools that promote connection, like discussion boards and group projects, can help close these gaps for low-income students.

Table 1 *Frequency of PLE among Malaysian students on age*

Factors	Level	Frequency (f)	Percent (%)	Cumulative Percent (%)	Nominal by Interval Eta (η^2)	
					Age	Recode dep
SC Self-Concept of the learning process	High	168	84.8	84.8	.100	.201
	Moderate	29	14.6	99.5		
	Low	1	.5	100.0		
PM Planning and management of learning	High	160	80.8	80.8	.070	.178
	Moderate	37	18.7	99.5		
	Low	1	.5	100.0		
RT Use of resources and tools	High	144	72.7	72.7	.073	.138
	Moderate	53	26.8	99.5		
	Low	1	.5	100.0		
SI Social interaction (communication and linguistic ability)	High	131	66.2	66.2	.042	.083
	Moderate	66	33.3	99.5		
	Low	1	.5	100.0		
	Total	**198**	**100.0**			

To be sure, when breaking down the results by income and gender it is easy to see that there are significant differences in student performance across the four PLE factors; self-concept, planning & management, Tool and Resource Use and Social interaction. In all four variables, female students consistently outperform their male peers, with more students indicating "High" for each variable Cohen's effect size (η2) for domain of social interaction based on table 2, indicates the quite small but moderate influence of gender on students' social involvement in educational settings ($\eta SI(g)^2$ = 0.115). This echoes findings of longstanding gender gaps in wages and employment. This is worsened by the additional negative labor force effects among mothers, who are more likely to interrupt their careers and work reduced hours while fathers often receive a wage boost (Economic Policy Institute, 2023; Hegewisch et al., 2024; Pew Research Centre, 2022). Other PLE features that present small-size effect sizes across gender are self-concept ($\eta SC(g)^2$ =0.041), planning and management ($\eta PM(g)^2$=0.023), and use of resources and tools ($\eta RT(g)^2$=0.025). With expectations on social roles anchored in society and culture, these results suggest that gender may play a stronger role in the relational and community-based aspects of schooling (Institute for Women´s Policy Research, 2024; World Economic Forum, 2023).

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In addition, the high number of women (96) scoring "High" on the Self-Concept scale - versus men (72), suggests that they are more likely to employ reflective stands such as journals and feedback systems. Likewise, whereas more female (90) than male (70) students were awarded a "High" in Planning and Management. According to Sun and Xu (2024), woman often reside under the influences of cultural norms that value organisation and multitasking, which is the reason why they tend to utilise PLE features as goal-setting and team-working functions. Men did, however, dominate the "Moderate" category which suggests that formal training may benefit men in effectively using reflective and organisational PLE techniques.

Table 2 *PLE among Malaysian students on gender*

Factors	Gender	High	Moderate	Low	Total	Nominal by Interval	
						Eta (η^2)	
						Gender	Recode dep
SC **Self-Concept of the learning process**	Man	72	13	1	86	.083	.041
	Woman	96	16	0	112		
		168	29	1	198		
PM **Planning and management of learning**	Man	70	16	0	86	.063	.023
	Woman	90	21	1	112		
		160	37	1	198		
RT **Use of resources and tools**	Man	61	25	0	86	.076	.025
	Woman	83	28	1	112		
		144	53	1	198		
SI **Social interaction (communication and linguistic ability)**	Man	51	35	0	86	.148	.115
	Woman	80	31	1	112		
		131	66	1	198		

Results on income in Table 3 affect these results, as eta values from $\eta SC(i)^2=0.025$ for self-concept to $\eta PM(i)^2=0.107$ for planning and management all indicate weak relationships between income levels and PLE considerations. The most significant differences were observed in social behavior and tool used. The students from higher-income groups (RM9001 above) always scored "High" for many aspects. They are provided with the latest digital tools and proper internet connection. For instance, 16 students in the RM9001 and above category received "High" for Resource Utilisation while only 95 students in the RM1000–RM4000 group received similarly. Yet, the latter also had the highest percentage in "Moderate", which may point to challenges in accessing or optimizing tools. Spending time with working-class students was related to more frequent ratings of "High" on the Social Interaction scale while receiving a "High" on the same scale was more common among students who later had higher-income peers, probably thanks to the greater opportunities for rich cultural exchanges and collaborative learning within middle- or upper-class contexts. Lee and Wong (2023) and Berbel Gimenez and Borras-Gene (2023) highlight the importance of ensuring everyone has equitable access to digital tools and teams.

Table 3 *PLE among Malaysian students on income*

Factors	Income	High	Moderate	Low	Total	Nominal by Interval	
						Eta (η^2)	
						Income	Recode dep
SC **Self-Concept of the learning process**	RM1000-RM4000	112	20	0	132	.061	.025
	RM4001-RM9000	39	6	1	46		
	RM9001 above	17	3	0	20		

		168	29	1	198		
PM Planning and management of learning	RM1000-RM4000	108	23	1	132	.046	.107
	RM4001-RM9000	34	12	0	46		
	RM9001 above	18	2	0	20		
		160	37	1	198		
RT Use of resources and tools	RM1000-RM4000	95	36	1	132	.059	.057
	RM4001-RM9000	33	13	0	46		
	RM9001 above	16	4	0	20		
		144	53	1	198		
SI Social interaction (communication and linguistic ability)	RM1000-RM4000	86	46	0	132	.082	.067
	RM4001-RM9000	30	15	1	46		
	RM9001 above	15	5	0	20		
		131	66	1	198		

Conversely, men from lower-income households are over-represented in the "Moderate" categories as they tend to struggle with gender-aligned participation and women with higher incomes outperform. To address these inequities, targeted interventions are needed such as distribution of equipment, accessible PLE designs, and training programs (Wilson et al., 2023). Such programs can also promote equitable gendered and economic outcomes in the uptake and effectiveness of PLE by closing the gender and economic divide. In conclusion, by using Taylor's paradigm, there are little associations of age with the PLE variables, while much stronger effect exists between sex and wealth. The results show the importance of inclusive designs for a PLE that can reach those with fewer resources but also take gender differences in motivation and participation into account. Examples include free access to digital devices and subsidized internet-targeted initiatives that can maximize PLE gains for different populations of learner's scores.

5. Conclusion

The study shows that Personal Learning Environments (PLE) can improve Malaysians student's psychological health and academic performance. PLE assume that key competences such as self-concept, planning, resource utilisation and social interaction need to be fostered. 84.8% of students showed high levels of confidence, self-awareness and student engagement in these domains. At trying times such as the pandemic COVID-19, PLEs promote independence and flexibility among students while also supporting team effort. But hurdles were identified — over differential technology literacy and access to digital environments, particularly among migrant students. To fully realise the promise of PLE, there is a need for policies that facilitate equitable access to resources and training opportunities as well as inclusive digital education.

Acknowledgement

This research was supported by Universiti Tun Hussein Onn Malaysia (UTHM) through University Contract Grant (vot Q268).

Conflict of Interest

The Authors declare that there is no conflict of interests regarding the publication of the paper.

Author Contribution

The authors confirm contribution to the paper as follows: ***Tee Tze Kiong:*** *Literature review, methodology, data collection and project administration.* ***Andika Bagus Nur Rahma Putra:*** *Drafted the manuscript and provided substantial revisions formal analysis, and validation.* ***Eddy Sutadji & Yusmarwati Yusof:*** *Contributed to writing the results and discussion sections, conceptualization, methodology and resources.* ***Lutfiah Natrah Abbas@Ahmad & Norkhairolizah Hamzah:*** *Conceptualization, methodology and resources.*

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