

**TRANSITIONAL SPACE IN TERTIARY
INSTITUTIONS AS INFORMAL LEARNING
SPACE TOWARDS 21st CENTURY EDUCATION**

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**TRANSITIONAL SPACE IN TERTIARY
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by

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LIST OF ABBREVIATIONS

ANOVA	Analysis of Variance
IR 4.0	Fourth Industrial Revolution
IoT	internet of things
MEB	Malaysia Education Blueprint 2013-2025
TVET	Technical and Vocational Education and Training
OBE	Outcome-based education
SLT	Student Learning Time
ILS	Informal Learning Space
PUO	Politeknik Ungku Omar
POLIMAS	Politeknik Sultan Abdul Halim Mu'adzam Shah
PSP	Politeknik Seberang Perai
TCL	Teacher-Centred Learning
PST	Pedagogy-Space-Technology
BYOD	Bring your own devices
SCL	Students Centred Learning
APPCC	Asia Pacific Accreditation and Certification Commission
EFA	Exploratory factor analysis
MANOVA	Multivariate Analysis of Variance
ICT	Information, Communication and Technology

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**RUANG PERANTARAAN DI INSTITUSI PENDIDIKAN TERTIARI SEBAGAI
RUANG PEMBELAJARAN TIDAK FORMAL DALAM PELAKSANAAN
PENDIDIKAN ABAD KE-21**

ABSTRAK

Revolusi Industri 4.0 dan pandemik Covid-19 telah mempengaruhi corak sistem pendidikan secara global. Tambahan pula, perkembangan ICT dalam bidang Pendidikan telah membawa kepada penemuan Teori Pembelajaran baru yang dikenali sebagai Teori Pembelajaran “Connectivism”. Dengan ini, institusi pendidikan terpaksa beranjak dari mod pengajaran dan pembelajaran secara bersemuka kepada mod pengajaran dan pembelajaran secara dalam talian. Walau bagaimanapun, anjakan ini merupakan satu cabaran besar dalam persediaan awal pelaksanaan pembelajaran secara maya. Sewajarnya, ruang pembelajaran secara tidak formal merupakan satu pekara asas yang perlu diberi tumpuan dalam melaksanakan pembelajaran dalam talian. Dengan ini, ruang pembelajaran tidak formal yang ideal perlu dirancang dan direkabentuk untuk tujuan pembelajaran dalam talian. Apa yang menjadi persoalan adalah ruang pembelajaran yang sedia ada di institusi pendidikan dipertikaikan keberkesanannya. Oleh itu, kajian ini mendapatkan persepsi pelajar terhadap tiga jenis ruang pembelajaran tidak formal dan juga mengenalpasti ciri-ciri ruang pembelajaran tidak formal yang kondusif and ideal. Hubungkait diantara ciri-ciri ruang pembelajaran tidak formal dengan tiga jenis ruang pembelajaran tidak formal juga diberi tumpuan dalam kajian ini. Kajian ini menggunakan kaedah penyelidikan explorasi gabungan untuk mencapai objektif kajian. Kajian ini melibatkan pelajar diploma dari tiga institusi pendidikan di Malaysia. Kaedah pengumpulan data secara kualitatif (kumpulan fokus

dan temuduga) dan kuantitatif (soal selidik) digunakan dalam kajian ini. Data kualitatif dianalisis dengan menggunakan kaedah kandungan, manakala data kuantitatif dianalisis menggunakan kaedah statistik deskriptif dan inferensi. Keputusan kajian mendapati kedua-dua aspek sosial dan fizikal mempengaruhi rekabentuk dan pengoperasian ruang pembelajaran secara tidak formal. Hasil kajian mendapati, pelajar berpuas hati dengan penyediaan ruang pembelajaran tidak formal dari segi aspek sosial iaitu: interaksi, koleberasi, autonomi dan privasi. Walau bagaimanapun pelajar menyatakan ketidakpuas hati terhadap penyediaan ruang pembelajaran tidak formal dari segi aspek fizikal iaitu: susunatur rekabentuk, keselesaan, kemudahan ICT, dan estetik. Pelajar juga menyatakan ruang pembelajaran tidak formal yang berkisar dengan alam semulajadi merupakan ruang paling digemari oleh pelajar untuk tujuan mempelajari tidak formal. Akhir sekali pelajar mengariskan bahawa ruang pembelajaran secara tidak formal amat sesuai untuk tujuan interaksi pembelajaran dikalangan pelajar, manakala, aspek autonomi tidak mempengaruhi penggunaan dan pemilihan ruang pembelajaran secara tidak formal. Penemuan ini membantu penyelidikan yang berkaitan dengan kajian interaksi manusia dan persekitaran. Secara keseluruhan, kajian ini memberi impak besar dalam merialisasikan ruang pembelajaran tidak formal alaf baru.

TRANSITIONAL SPACE IN TERTIARY INSTITUTIONS AS INFORMAL LEARNING SPACE TOWARDS 21ST CENTURY EDUCATION

ABSTRACT

Undeniably, industrial revolution 4.0 and Covid-19 pandemic have wedged education system globally. The expansion and evolution of ICT in education evolution led to present-day learning theory called connectivism learning theory. Therefore, education institutions should choose to transform their course of action from the conventional norms to an already seemingly positive alternative of embracing online learning and informal learning. Online learning and informal learning occur with significant challenges, namely, technology access as the primary indicator of online readiness. Accordingly, an opposite informal learning space is compulsory to uphold the nature of this online learning which is more to informal learning or non-face to face learning. The effectiveness of the contemporary physical learning environment in higher education is questionable. A conducive and favorable learning space turns into a decisive issue globally. Hence, this research aims to determine learners' perceptiveness and learners' preferences attributes across three types of informal learning space. Furthermore, the relationship between informal learning space preferences attributes and three types of informal learning space needed to be evaluated. An exploratory sequential mixed method research design was employed to achieve these aims. This study involved diploma students from three Polytechnics. Focus group and semi-structured interviews were engaged for the qualitative part (n=46), whereas questionnaires were engaged for the quantitative part (n=1079). Qualitative data were evaluated using content analysis, and quantitative data were presented using descriptive

and inferential statistics. Findings from RO1 indicated that learners' perception of informal learning space relies heavily on social attributes than physical attributes. Thus, it can be concluded that physical attributes such as comfort, ICT facilities, layout, and aesthetics need to be improved than social attributes. Learners indicated that semi-outdoor informal learning space is the most preferable venue for informal learning activities on campus. Meanwhile, findings from RO2 indicated eight informal learning space preferences attributes need to be integrated for ideal informal learning space design process based on Malaysian context. This research recognised that there is a significant relationship between the informal learning space preferences attributes and informal learning space typology. Finding revealed that interaction attributes has the highest correlation, followed by aesthetics, comfort, privacy and semi-privacy, and layout. These findings make an important contribution to the person-environment transactional relationship. As a whole, this study has a significant kick-off impact in encouraging future new generation learning space conceptualisation.

CHAPTER 1

INTRODUCTION

1.1 Chapter Overview

This chapter provides an overall idea and outline of the research. The framework is a preface to the chapters and sections acquired in this research. Chapter one composes the research background, problem statement, significance of the study, research objective, scope of the study, research methodology, definition of key terms, and organisation of the chapters.

1.2 Research Background

In the past two decades, transformation which involved tertiary education worldwide is crucial due to the capacity and complexity of the trends designated as "Academic Revolution". Altbach et al. (2019) stated that "academic revolution" is a transformation series that has exaggerated most post-secondary education features worldwide. A similar tremendous alteration occurred in the Malaysian higher education scenario (Yahaya, 2014; Valtonen et al., 2021). Globalisation and ubiquitous technologies are the fundamental matter which greatly afflicted higher education in the 21st century, particularly during the Covid-19 pandemic. Education 4.0 is a purposeful approach to learning that is aligned with the fourth industrial revolution (IR 4.0) which is about transforming the future of education using advanced technology and automation. Education 4.0 is global connectivity, smart machine, and new media are some of the attributes that have reshaped the current teaching and

learning model. Indeed, the approach towards Education 4.0 will be dramatically different whereby it metamorphoses the way people foresee work, what constructs work and composition, how we learn and foster the skills needed in the future. Education 4.0 is massive in diversity, new dimensional, new collaboration of learning and self-directed. In fact, Education 4.0 responds to the needs of the fourth industrial revolution, where men and machines are aligned to enable new possibilities. Furthermore, the emerging of global Internet-based information architecture, known as the “internet of things” (IoT), have additive advantages over the traditional communication technologies. A new vision of learning is emerging, emphasizing on the importance of knowing why we need something, knowledge or skills and where to find it rather than dumping it all in. Learners to learners will get more popular among learners, and educators’ role are just as facilitators (Yahaya, 2014).

Meanwhile, Corona Virus Disease (Covid-19) outbreak has provided challenges for the educational institutions. Anticipating the transmission of the virus, the government has issued various policies, such as isolation, informal and physical distancing, to large-scale social restrictions. These conditions requires the citizens to stay at home, work, worship, and study at home (Bahasoan et al., 2020). In Malaysia, the coronavirus outbreak has caused learning institutions to embrace online learning due to the lockdown and campus closure (Kamal et al., 2020).

The literature have revealed that the next generation group desired to stay and study in active, dynamic, and conducive learning ecological systems, self-governing, high-tech and informal learning spaces (Walton & Matthews, 2018; Pimmer et al., 2016). Unfortunately, most academic institutions were built way back in the 70s' and 80s' (Leadership in Education Facilities, 2012). Altbach et al. 2019 defined

globalisation as the phenomenon configured by accelerating integrated world economy, new information and communication technology, the advent of an international knowledge network, the English language's importance, and other factors exceeding the supervision of academic institutions.

Undoubtedly, the accelerated development of Information and Communication Technology (ICT) and latest learning theory have influenced higher education institutions to various extents (Polak, 2016). Moreover, the challenge of whether higher education institutions are feasible to aid tomorrow's teaching and learning in today's school environment. Above all, higher education institutions have to be premeditated as a profound education mechanism rather than a conventional learning milieu (Polak, 2016). Indeed, the nexus of ICT in education, permissive a contemporary methodology in pedagogy and learning (Beckers, 2016). The conventional learning theories are still being used in the education systems, such as behaviourism, cognitivism, and social constructivism, existed without computer technology in education (Beckers, 2016). Consequently, the application of ICT in teaching and learning drew up the latest learning theory named Connectivism Learning Theory. In detail, connectivism is one of the learning theories that elucidates on how ICT sets out an authentic tribune for learners to learn and share knowledge across the World Wide Web and among learners (Corbett and Spinello, 2020; Siemens, 2016).

Illeris (2016) explained three homogeneous interactions among students and educators: 1) teaching directions from a teacher's perspective, 2) teaching directions from a learners' perspective, and 3) teaching direction with both teacher and learners' involvement. Primarily, the teacher-centred teaching approach is developed based on behaviourism, and the responsibility for teaching falls on the educators' shoulders.

Meanwhile, cognitivism is a deviation from the teacher-centred approach, which provides extra freedom for learners to manage their own learning based on their preference and which suits them best (Balakrishnan and Gan, 2016). Likewise, the social constructivist theory emphasises that working is better in a small group. The focus is on engaging students to work together, exchanging and sharing ideas, and challenging each other's perspectives (M. G. Jones and Brader-Araje, 2002). Beckers (2016) mentioned that most social constructivist models focus on collaborative learning among peers and shifted the teacher's role from "the sage on the stage to the guide on the side".

Whilst, connectivism has emerged due to alternative information storage, processing, and recall through devices and network connections. According to Siemens (2016), connectivism is learning from peers and learning in, especially from the social media platform, digital or virtual networking. Moreover, connectivism declares know-how and know-what are appendices with know-where, which refers to interpreting where to search for the required knowledge. Goldie (2016) indicated that connectivism consummates the needs of the 21st century learners, where learners progress far away from content expenditure into critical thinking, collaboration, and content formulation.

Moreover, as Maheran et al. (2017) mentioned an appropriately designed informal learning space (ILS) in higher institutions demands more desirable learning outcomes and learning performances. The campus environment provides the best prospect for producing a conducive learning setting, especially with suitable physical element, open spaces, and appropriate landscape settings. Nevertheless, less emphasis has been given to fulfil learners' needs on the exposure to outdoor experience in higher

education institutions. Currently, higher education institutions accentuate more on the traditional instructional methods rather than emphasising on learners' learning needs (Maheran et al., 2017). An outdoor study environment can inspire educators, learners, and educators to obtain adequate knowledge and substitute for learning the interrelation within natural resources. Concerning this, teaching and learning will go beyond the boundaries by changing the educational curriculum outdoors and involving nature and physical aspects in the informal learning setting (Maheran et al., 2017).

Currently, the present-day teaching and learning environment is designed more towards formal teaching and learning milieus such as lecture halls, air-conditioned classrooms, and laboratories without considering the transitional spaces, outdoor areas, and campus surroundings (Ibrahim et al., 2013). This traditional education approach, which disfavors the academic aspirations of 21st-century education which boosts learners' exposure to the natural environment and gains learning experience outside the classroom (Boholano, 2017). Studies by Neda and Andrew (2021) confirmed that the consideration of ILS should start from primary school until the university level to promote students informal learning activities. While the majority of research on Innovative Learning Environments have focused on classroom design, little attention has been paid to the usage and the design of the school have not noticeably changed. However, there are several reasons for considering Outdoor Innovative Learning Environment design in schools as a way to contribute to improving learning. Some studies reveal that social health, intelligence, and creativity of people can be enhanced by spending more time in natural environments (Neda and Andrew 2021). Due to the non-functional design of learning spaces, most students spend their indoor break time by going outdoor (Matloob et al., 2014). A proper outdoor setting can inspire students to exploit the spaces, especially the transitional

spaces (Ibrahim et al., 2013). In this research, the focus will be on the three types of prescribed ILS, namely semi-enclosed ILS (internal corridors, entrance lobbies, foyer and hallways), semi-outdoor ILS (courtyard, atrium, terrace, external corridors and porch), and outdoor ILS (students pavilion, gazebo, green space and square) (Liang, 2013). Therefore, adequate ILS that promotes various learning activities is needed in all higher education institutions to assist learners' learning behaviour mechanisms and to integrate IoT, Education 4.0 in ILS (Maheran et al., 2017).

Furthermore, Harianto et al. (2019) revealed that decisive learners' behavior and interaction with outdoor learning settings can develop a sense of belonging, conceive social interaction, and intensify personal skills inclusive of a positive self-concept. The behavior and interaction influenced by several factors, such as genetic make-up, culture and individual values and attitudes. In fact, the research also focuses on the benefits of outdoor classroom: (i) broadening education, (ii) enhance individual potential, (iii) motivating self-directed learning, and (iv) fine-tune students' intellectual ability and psychological development (Harianto et al., 2019). In sum, promoting ILS is a nexus of learning theory, placemaking and architecture, which needs synergy between all those aspects (Deborah Harrop and Turpin, 2013). An ideal learning space can promote learning and attain learning objectives among learners.

1.3 PROBLEM STATEMENT

In analysing the future education shift, Industrial Revolution (IR) 4.0 has become the main domain's ascendancy in the global education movement. IR 4.0 has impacted many disciplines worldwide, namely education, medical, and engineering (Wallner and Wagner, 2016). Imperatively, in Malaysia, the effect of the global Covid-19

pandemic has hindered the operations of all learning institutions. To further control the escalating infection rate of the deadly coronavirus, the Malaysian government has issued a movement control order (MCO) that affected the learning institutions' operation and activities. Hence, learning institutions should choose to alter their course of action from the standard norms to a seemingly positive alternative by embracing online learning.

Nevertheless, online learning comes with substantial challenges, such as the learners need to have technology access as the primary indicator of online readiness. Highlighting a report from UNESCO, over 87% of the worlds' student population from more than 160 countries were impacted by the lockdown. In Malaysia, this unprecedented crisis has provided an opportunity to improve online education for almost 5 million school students and 1.2 million university students (Kamal et al., 2020). Hence, online and web-based learning platforms have become dramatically popular. Thus, a suitable learning space is obligatory to embrace the nature of this online learning which is more to informal learning or non-face-to-face learning. An alternative spatial alignment is essential to explore the new informal learning environments.

At present, most multidisciplinary researchers have discussed learners' suitability to fulfil the prerequisite of IR 4.0 and to embrace online learning. Consequently, the massive and vast development of ubiquitous ICT formulates the conceptualisation of Education 4.0 to develop human capital towards Industry 4.0 (Ciolacu et al., 2017; Schuster et al., 2016; Wallner and Wagner, 2016). In truth, the conventional education system, so-called "traditional education", developed as an aligned industrial structure that manages students like an assembly line. Thus, it has failed to embrace IR 4.0 in terms of employee capabilities, abilities and propensity

(Beckers, Van der Voordt, et al., 2016). In fact, education sector is also envisioned as a profound education industry, which is progressively influenced by Digital Transformation and Communication (Ciolacu, Svasta, et al., 2017). The first education revolution commenced by implementing the letterpress, and subsequently, the second education revolution introduced the programmed lesson (Sanchez, 2017). Meanwhile, the third education revolution introduced E-learning, and it encompasses electronic and digital media in teaching and learning operations. Finally, in the Education 4.0 era, learners are expected to be self-directed learners. Whereby, students have the authority and be in-charged of their own learning activities and undertakings, construct and exploit the use of networks, cooperate, and utilise ICT to achieve vigorous, relevant, and comprehensive knowledge (Corbett and Spinello, 2020). In a nutshell, the teaching paradigm has shifted from teachers-centred to learners-centred. Therefore, research on spatial alignment and physical academic learning environment is needed to fulfil the pedagogical shift. In fact, the efficiency of the current physical learning setting in higher education is questionable.

Imperatively, traditional learning theories, namely: behaviourism, cognitivism, and social constructivism, were established during the absence of computer technology in the education framework (Beckers, 2016). The expansion and evolution of ICT in education has led to the present-day learning theory called connectivism learning theory (Corbett and Spinello, 2020; Siemens, 2016). Connectivism learning theory challenges traditional information storage and recalls via framework devices and network links and connections. Hence, connectivism attained the 21st century learning skills for students whereby learners has shifted from content utilisation into

critical thinking, collaboration, and content formation. More concisely, teaching and learning undertaking has undergone a massive transformation from school as a place of instruction in the 19th century to a setting that produces learning in the late 20th century, finally to a space that composes and constructs knowledge in the 21st century education (Siemens, 2016). Hence, the next generation learning space preferences attributes need to be established to enhance the teaching and learning undertakings in the 21st century education.

At this point, higher education anticipates a mandatory change in the physical academic learning environment due to the new ways of educating students (Beckers et al., 2015). In reality, the higher education system in the 21st century should compete and challenge other educational institutions (Walton and Matthews, 2018). National Centre for Education Statistics (2006) stated that *"Along with its human resources, financial assets, and intellectual cache, space is a primary resource of an educational institution"* (Rooney et al., 2006). Previous studies showed confirmation on the effect of physical learning environment on learners', specifically enhancing learning possibilities and increasing student engagement (Zandvliet and Broekhuizen, 2017). The effectiveness of the contemporary physical learning environment in higher education is questionable. Nenonen (2015) emphasised that extra learning tasks happened outside of the class period. Therefore, a conducive and favorable learning space turns into a decisive issue globally (Ibrahim et al., 2013; Nenonen, 2015).

Currently, higher education is moving into the essential prerequisite and compatibility of next generation learning space whereby nexus by formal, informal and virtual learning environment (W. M. Jones and Dexter, 2014; Sommerauer and Müller, 2015). This point of view stated that learners' learning behaviour can occur

anytime, anyhow and anywhere. Levine and Dean (2012) mentioned that next generation learners are labelled as "the first generation of digital natives". They grew up together with ICT and "live in anytime/anyplace world operating 24 hours a day, seven days a week, unbound by physical location" (Levine, 2010). For this reason, it is best to discover a new emerging concept of ILS. The ILS promotes students' engagement, learning experiences, web-based learning, and collaborative activities (Dole et al., 2016; Kamal et al., 2020; Kumar and Bhatt, 2015; H. K. Wilson and Cotgrave, 2016).

The ILS are scattered all over campus: internal corridors, entrance lobbies, foyers, hallway, courtyard, atrium, external corridors, students pavilion, gazebo, green space, square, café, resources center, and library. Based on the architecture terminology, these ILSs are categorised as transitional spaces. Furthermore, based on the observations in polytechnics, substantial evident shows learners utilizing transitional spaces as collaborative and self-regulated learning spaces. These spaces will enhance individual learning, small groups study activities, online learning and social activities (Beckers, 2016; Kamal et al., 2020). Harrop and Turpin (2013) explained that an ideal ILS should in-cooperate learner's behavioural needs, namely interaction, conversation, community, and retreat. As mentioned by Ibrahim et al. (2013) "*informal learning setting in Malaysian higher education remains unexplored and need to be re-evaluated*" and designed lack of proper empathy of what learners desired (Deborah Harrop and Turpin, 2013; Boholano, 2017). Consequently, there is a need to undergo empirical research to acquire a proper spectrum about the contemporary informal learning spaces appropriateness based on learner's standpoint.

As stated in Malaysia Education Blueprint (MEB) 2013-2025, polytechnics have pioneered the TVET by producing graduates who are able to fulfil nations' high skilled workforce demand. Specifically, the 4th shifts in MEB, focusing on producing high quality Technical and Vocational Education and Training (TVET) graduates. Under the Economic Transformation Programme (ETP), Malaysia requires a 2.5-fold increase in the TVET enrolment by 2025. Furthermore, TVET is seen as a less attractive pathway than the general university education. Therefore, Malaysia needs to make sure that conventional academic and TVET pathways are equally valued and cultivated (Kementerian Pendidikan Malaysia, 2015). Above all, the polytechnic's curriculum delivery processes should provide various strategies for the lecturers to impart theoretical knowledge to the students and to engage them with hands-on skills that are pertinent to their future workplace. The polytechnic's curriculum delivery processes are based on the outcome-based education (OBE) approach, which specifies the curriculum's intended outcomes (Department of Polytechnic Education, 2015).

Outcome-based education (OBE) is an educational theory in which each part of an educational system is based on goals (Sun, 2019). Rao (2020) defines OBE as a process of "clearly focusing and organising everything in an educational system around what is essential for all students to be successful by the end of their learning experiences. According to the polytechnic syllabus, Student Learning Time (SLT) is distributed according to the course learning and teaching activity. The SLT in polytechnic is segmented into two types, namely: 1) face-to-face learning activities (formal learning) which comprise of lecture, studio, practical, and tutorial, and 2) non-face-to-face learning activities (informal learning and non-formal learning) such as preparation before theory classes, preparing for group activities, preparing for a

presentation, and preparing for continuous assessment. In reality, the SLT distribution for the non-face-to-face learning in the polytechnic syllabus is much greater than face-to-face learning. Unfortunately, there are no proper physical learning settings for non-face-to-face learning activities compared to face-to-face learning activities in polytechnic campuses except for libraries and cafes. Learners have to utilise most of the transitional spaces available around the polytechnic compound, such as the entrance lobby, foyer, gazebo, internal corridors, external corridors, courtyard, café, open green area, pavilion, and gazebo for non-face-to-face learning activities and online learning. Ibrahim et al. (2013) stated that learners are presumed to use a notable amount of their learning time outside the classroom environment to manage their self-directed learning activities. Due to this ambiguity, several interviews has been conducted to explore the effectiveness of the transitional spaces. Commonly, the transitional spaces are also recognised as informal learning/social learning space/flexible space/third spaces. The principal interrogations are the preferred ILS or location for informal learning activities, the ILS preferences attribute, and the relationship between learners' perceptiveness and ILS preferences attributes. Furthermore, several past studies disclosed that there was a significant impact of the physical and social dimension of the learning environment (Norhati Ibrahim and Fadzil, 2013b; Z. Yang et al., 2013) on learners' academic performances in terms of enhanced learners' learning potentials (Bligh and Crook, 2017) and improved students' engagement (Waldock et al., 2017). Ibrahim et al. (2013) stated that the entire ILS operationalisation in Malaysian higher education institutions still remains unexploited. Therefore, this study can fill the gaps and should be able to provide significant insight into ILSs operationalization for informal and online learning.

1.4 Research Questions

- 1) What is the preferable informal learning space design typology for informal learning activities?
- 2) How learners' perceived informal learning space based on physical and social dimensions?
- 3) What are the informal learning space preferences attributes?
- 4) Is there any statistically significant association between the informal learning space preferences attributes and three types of informal learning space?

1.5 Research Aim and Objective

This study explores learners' spatial operationalisation of ILS. Furthermore, this research investigates learners' behavior, perceptiveness and preferences towards ILS typology and identifies the principal attributes of ILS in reliance on learners' standpoint via the following objectives.

- 1) To determine learners' perceptiveness across three types of Informal Learning Spaces typologies.
- 2) To identify learners' preferences attributes towards Informal Learning Space.
- 3) To evaluate the relationship between Informal Learning Space preferences attributes and three types of Informal Learning Space.

1.6 Scope of the Study

The research is grounded in transactional psychology research, inducing exploratory sequential design to explore the learners-environment behavior relationship. This research explores learners' behavior, perceptions and preferences on ILS among polytechnic learners. This research was executed in three polytechnics in Malaysia, namely: i) Politeknik Ungku Omar, Ipoh Perak (PUO), ii) Politeknik Sultan Abdul Halim Mu'adzam Shah, Kedah (POLIMAS), iii) Politeknik Seberang Perai, Pulau Pinang (PSP). As identified in Malaysia Education Blueprint 2013-2025 (MEB), polytechnics have established the TVET by producing graduates who are able to fulfil high skilled workforce demand in Malaysia. Consequently, Malaysian Polytechnics are chosen as the study areas in this research. In detail, the social and physical dimensions (independent variables) of the ILS are expected to influence the entire operationalisation of informal learning activities at the prescribed ILSs (dependent variables), namely: i) semi-enclosed ILS (internal corridors, entrance lobbies, foyer and hallways), ii) semi-outdoor ILS (courtyard, terrace, external corridors and porch), and iii) outdoor ILS (gazebo, green space and square). It is also expected that learners' informal learning behaviour will influence learners' perceptions and preferences towards ILSs. Thus, learners will ponder on an ideal ILS that can support informal learning activities on campus.

1.7 Significance of the Study

The literature has revealed that academic transformation occurred in academic sector globally due to "globalisation" and the Covid-19 pandemic (Kamal et al., 2020; Schuster et al., 2016). No doubt, that IR 4.0 has been enforced in many fields, including education via Education 4.0 (Ciolacu, Tehrani, Beer, and Popp, 2017; New Straits Times, 2018). The recent Covid-19 pandemic has inspired vital changes in the education system. The vast development of ICT formulated a latest learning theory called connectivism learning theory (Aldahdouh and Caires, 2015; Beckers, 2016). Thus, implementing a latest learning theory in higher education can enhance 21st century learning skills such as critical thinking, creativity, collaboration, communication, information literacy, media literacy, technology literacy, and flexibility. Consequently, 21st century learning skills will significantly impact learners and develop learners to be resilient graduates.

No doubt, traditional learning theories, namely behaviourism, cognitivism, and social constructivism have been widely applied in Malaysian Educational systems in all levels of education, starting from pre-schooling, primary, secondary, post-secondary and tertiary education. Literature showed that the significance of connectivism as a latest learning theory is showed with the application of 21st century learning skills, critical thinking, collaboration, online learning and content formation (Beckers et al., 2016). Above all, spatial implications of new ways of learning, so-called student-centred learning in higher education, are entirely different from traditional learning methods (Elizabeth, 2015; Lund and Stains, 2015; Boholano, 2017). Imperatively, most higher education institutions emphasise on conventional

instructional teaching technique, which aligns with formal learning (Ibrahim et al., 2013). In reality, the student-centric concept is currently new in Malaysia and getting popular among tertiary education institutions, particularly during pandemics (Norhati Ibrahim et al., 2013; Norhati Ibrahim and Fadzil, 2013b; Kamal et al., 2020; Maheran et al., 2017).

According to the course outline, student learning time (SLT) is segmented into dependent learning time and independent learning time based on the polytechnic syllabus. The dependent learning time consists of time allocation for formal learning or face-to-face learning such as lecture, design studio, tutorial, and lab. Meanwhile, independent learning time focuses on informal, non-formal, and collaborative learning, such as preparing for theory class and preparing group presentations and group assignments. (Bagdonaite-stelmokiene and Zydziunaite, 2016). Based on the spatial alignment for dependent learning time, more alternative learning spaces are provided, such as classrooms, lecture halls, computer laboratories, seminar rooms, and conference halls. Meanwhile, for independent learning time, which is non-face-to-face learning, no alternative learning space is designed or premeditated. This is the knowledge gap that needs to be answered in this research. Generally, learners utilized accessible and available spaces for their informal learning such as café, library, internal corridors, external corridors, staircase, courtyard, gazebo, green area, outdoor learning space, covered open area, and pavilion. In other words, the spaces mentioned above are classified as ILS. This research provides excellent insight into the ILS, which is very significant in this digital era. Past research showed that proper and adequate academic learning space positively impacted learners' learning behavior, objectives and outcomes (Norhati Ibrahim and Fadzil, 2013b; Z. Yang et al., 2013).

Hence, current study explores learner's perceptiveness towards transitional spaces that are utilised as ILS setting on campus ground in higher education institutions, specifically polytechnics in Malaysia. Another additional value in this study is distinguishing the ILS attributes based on learner's viewpoint. The research adds to the body of knowledge by constructing the ILS preferences attributes based on the Malaysian context. Indeed, the former milieu of Malaysian Polytechnic campuses is outlined to accommodate formal teaching and learning, which emphasises more on instructional learning (Maheran et al., 2017).

As Nenonen (2015) claimed, more learning occurs outside of the classroom than in the formal classroom. Matthews and Walton (2018) mentioned that students who utilise the ILS delineate a higher level of student's engagement and positive correlation than non-users. In actual fact, there is a fair interdependence between the quality of ILS and learner's behaviour and success (Doshi et al., 2014). Quinnell (2015) claimed that tertiary education institutions are designed without an appropriate interpretation of what learners' desire (D. Harrop and Turpin, 2013). Indeed, the statements above supported the significant and fundamental matter. Hence, this matter has boosted the research on ILS at several polytechnics in Malaysia. This study focuses more on the physical learning environment. The concentration will be on the three types of prescribed ILS, namely semi-enclosed ILS (internal corridors, entrance lobbies, foyer and hallways), semi-outdoor ILS (courtyard, atrium, terrace, external corridors and porch), and outdoor ILS (students pavilion, gazebo, green space and square) (Liang, 2013).

1.8 Research Methodology

This study investigates learners' ILS operationalisation based on learners-environment exploration which is supported by Gibson's Affordance Theory (Aziz and Said, 2015; Lehrig et al., 2017; Quinnell, 2015). In this case, the study has engaged full-time diploma students from several polytechnics in Malaysia as respondents. As stated in the Malaysia Education Blueprint 2013-2025 (MEB), polytechnics have pioneered the TVET by its graduates fulfilling the nations' high skilled work force demand. Specifically, the 4th shifts in MEB, focusing on producing high quality Technical and Vocational Education and Training (TVET) graduates. Under the Economic Transformation Programme (ETP), Malaysia requires a 2.5-fold increase in TVET enrolment by 2025. Furthermore, TVET is seen as a lesser opportunity pathway than general university education in Malaysia. Hence, Malaysia needs to make sure that conventional academic and TVET pathways are equally valued and cultivated (Kementerian Pendidikan Malaysia, 2015). This study focuses on case study research, which focuses on the transitional space operationalisation as ILS. Therefore, the exploratory sequential method was adopted to answer the research questions. Thus, physical learning environments have become a profound and significant matter to uphold the new learning and teaching encounters. This research focuses on the suitability and the usefulness of informal learning settings to embrace Education 4.0. Thus, learners' behavior perceptions and preferences on ILS are integrated into exploring the effectiveness of ILS in higher education. Figure 1.1 explains that the research is executed in three phase

The first phase commenced with qualitative data collection to identify the independent variables. In sum, the first phase consists of two data collection methods, namely focus group and semi-structured interview. Subsequently, all the data collected are analysed using content analysis by using qualitative software (Quirkos) and transformed as independent variables. Later, all the information gathered is utilised to formulate survey items. In the third phase, quantitative data collection is conducted to investigate learners' behavior perceptiveness and preferences on ILS. Hence, the data was interpreted using descriptive and inferential statistical analysis. The comprehensive framework of this study is presented in Figure 1.2.

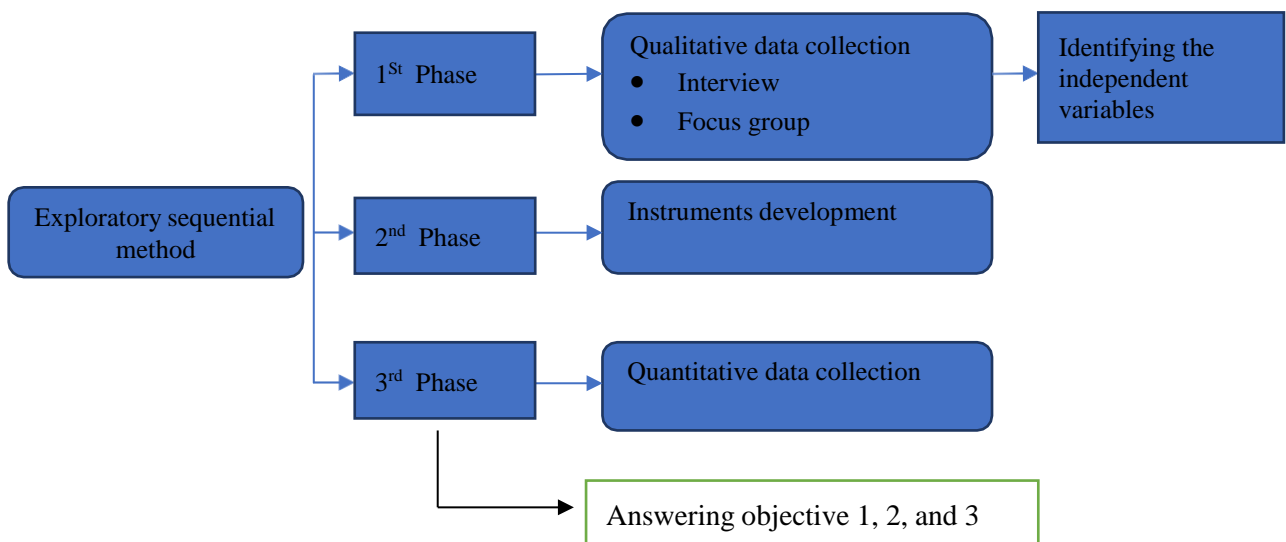


Figure 1.1 Data Collection Method

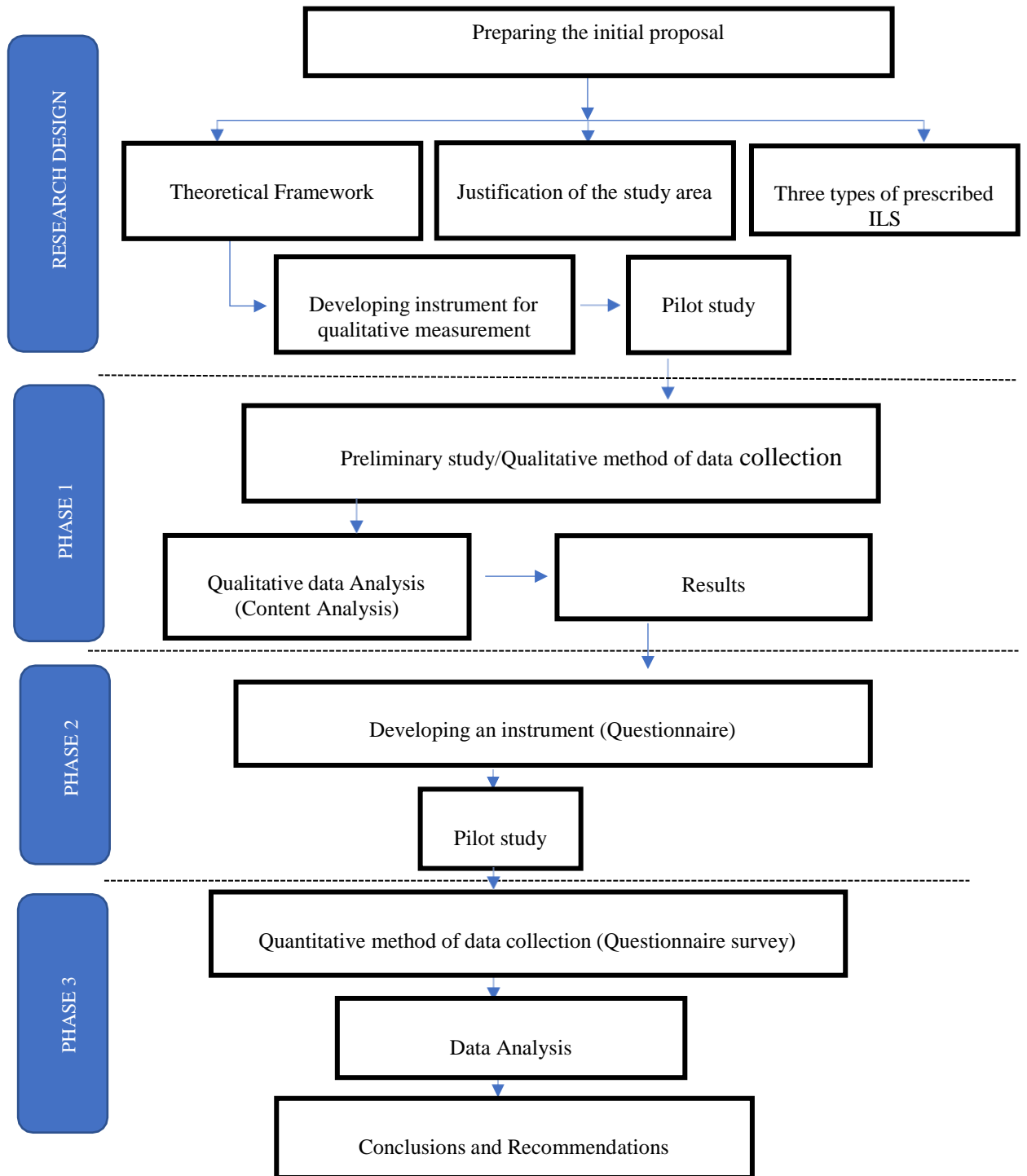


Figure 1.2 Study Framework

1.9 Definition of Key Terms

The earlier sections focused on the research methodology briefly. This section grants the description of keywords used in this study. The purpose is to clarify any ambiguities, which comprise of transitional space between two destinations, transitional space between interior and exterior, transitional space between nature and building, transitional space, informal learning space, and perceptual learning style.

1.9.1 Transitional space

Transitional space is a space that is not instantly inhabited by learners. In fact, the transitional space is positioned in between the interior and exterior setting and non-air-conditioned spaces (Taib and Ali, 2015). The principal function of transitional space is act as a buffer zone and a physical link (Prihatmanti and Taib, 2017). Therefore, based on the area's attributes, it can support informal learning.

1.9.2 Semi-enclosed ILS (type 1)

In the architectural context, transition spaces between two destinations are defined as enclosed spaces. It is a covered corridor with one extending along the wall of a building and supported with arches or columns and a wide hallway in a building where people can walk. These spaces are categorised under semi-enclosed ILS, namely internal corridors, entrance lobbies, foyers, and hallways (Prihatmanti and Taib, 2017). There is no direct connection with the outdoor environment.

1.9.3 Semi-outdoor ILS (type 2)

The transition spaces between exterior and interior are defined as semi-outdoor spaces: courtyard, atrium, terrace, and external corridors. Usually, it is an open area surrounded by walls or buildings, and it is semi-connected to the outdoor environment. The terrace is an external, raised, open, flat area in either a landscape, near a building, or a roof terrace (Weerasinghe and Fernando, 2017; Taib and Ali, 2015).

1.9.4 Outdoor ILS (type 3)

This space is classified as an outdoor learning space: student pavilion, gazebo, green space, and square. This setting enables students to learn, do group work, and be social with peers. Furthermore, these spaces are often called outdoor study environments (M. F. Shahidan, 2015; H. Pimmer et al., 2016).

1.9.5 Informal learning space

Ibrahim et al. (2013) stated that an ILS is a space that supports informal learning activities outside of their regular lecture hours. In truth, informal learning can take place in physical and virtual environments (Norhani Ibrahim, Fadzil, and Saruwono, 2013). Imms, Cleveland, and Fisher (2016) recommended the ILS to be positioned near classrooms, lecture halls, and learners gathering spots. Furthermore, they segmented the ILS into breakout space, outdoor learning space, group learning space, and individual pod (Imms et al., 2016).

1.9.6 Informal learning

Informal learning is utilised by learners for self-regulated learning, collaborative learning, or learning from experience. Informal learning does not have set of objectives in terms of learning outcomes. Niemi (2021) stated that informal learning is a student-driven course or programme that occurs outside of the classroom (or in the classrooms during out-of-class hours) and no direct teacher's involvement. In fact, informal learning is not directed by the institution but rather it is organised by learners themselves, exploratory, self-directed, and spontaneous (Greenhow and Lewin, 2016).

1.10 The Organisation of the Chapters

This section provides the flow of the arrangement of the research, namely: 1) Introduction, 2) Literature Review, 3) Research Methodology, 4) Data Analysis, Results and Discussion RO 1 and RO 2, 5) Data Analysis, Results and Discussion RO 3, and 6) Conclusion. Figure 1.3 provides an overview and synopsis of the thesis framework. Chapter One presents the outlook and linkage of research questions, objectives, and hypotheses. Meanwhile, the research questions were developed from the study of problem statement and the study of objective which provide a connection to the research questions. At the same time, the hypotheses emerged from the literature to answer the research questions. Chapter Two presents the learning space overview in higher education and provides a link between three main components in teaching and learning tasks: i) Pedagogy, ii) Space, and iii) Technology. The chapter highlights the significance of student-centred and informal learning spaces in educating learners. It also presented the emerging of latest learning theory and how it differs from conventional learning theory, Ecological Perceptual Psychology, which is profound in

learners-environment research, Gibson Theory of affordances, and the personality fit theory, conceptual model, and hypotheses development.

Chapter Three explains the research methodology employed in this study. It comprises of research design, exploratory sequential mixed methods, population and sampling, data collection, and analysis techniques for both phases. Subsequently, Chapter Four presents data analysis findings for qualitative and quantitative data. Chapter Five grants a discussion of the study findings. Finally, Chapter Six provides complete conclusion of this research. Also, the limitations of the study have been underlined, and suggestions for future research.