

**INFLUENCES OF LEARNING ENVIRONMENT
AND BASIC PSYCHOLOGICAL NEEDS ON SELF-
DETERMINED LEARNING OF POSTGRADUATE
STUDENTS: THE MEDIATING EFFECTS OF
HEUTAGOGICAL ACTIVITIES**

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UNIVERSITI SAINS MALAYSIA

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HEUTAGOGICAL ACTIVITIES**

by

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LIST OF SYMBOLS

β	Path coefficient
R^2	Coefficients of determination
f^2	Effect size
Q^2	Predictive relevance

LIST OF ABBREVIATIONS

AVE	Average Variance Extracted
BL	Blended Learning
BPN	Basic psychological needs
CR	Composite Reliability
F2F	Face-to-face
HA	Heutagogical Activities
HTMT	Heterotrait-monotrait
PBL	Problem-based Learning
PjBL	Project-based Learning
PLS-SEM	Partial Least Squares Structural Equation Modelling
SDL	Self-directed Learning
SDLRS	Self-directed Learning Readiness Scale
SDLTS	Self-directed Learning with Technology Scale
SLE	Social Learning Environment
SPSS	Statistical Package for Social Sciences
USM	Universiti Sains Malaysia
VIF	Variance Inflation Factors

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**PENGARUH PERSEKITARAN PEMBELAJARAN DAN KEPERLUAN
PSIKOLOGI ASAS TERHADAP PEMBELAJARAN DETERMINASI
KENDIRI PELAJAR PASCA SISWAZAH: KESAN PERANTARAAN
AKTIVITI HEUTAGOGI**

ABSTRAK

Kajian ini bertujuan untuk menyelidiki pengaruh persekitaran pembelajaran dan keperluan asas psikologi terhadap pembelajaran determinasi sendiri dalam kalangan pelajar pasca siswazah. Kesan perantaraan aktiviti heutagogi terhadap hubungan antara kedua-dua variabel ini juga telah dikaji. Kajian berbentuk kaedah campuran telah dijalankan di sebuah universiti penyelidikan di Malaysia untuk mencapai objektif-objektif kajian tersebut. Seramai 664 orang pelajar pasca siswazah telah disampel melalui soal selidik yang ditakbir secara dalam talian. Empat buah instrumen yang mempunyai kesahihan dan kebolehpercayaan yang tinggi telah digunakan untuk mengumpul data iaitu *Postgraduate Self-determined Learning Questionnaire*, *Learning Environment Scale*, *Basic Psychological Needs Satisfaction Scale* dan *Heutagogical Activities Scale*. Seterusnya, data kualitatif diperoleh melalui temu bual separa berstruktur dengan 28 orang pelajar pasca siswazah. Keputusan analisis deskriptif menunjukkan bahawa pelajar pasca siswazah mempunyai tahap pembelajaran determinasi sendiri yang tinggi ($M=3.18$; $SD=0.41$). Penglibatan pelajar dari program perubatan pergigian kesihatan, kejuruteraan dan sastera dalam aktiviti-aktiviti heutagogi yang melibatkan penerokaan adalah tinggi manakala keterlibatan mereka dalam aktiviti pembelajaran yang memerlukan perhubungan dengan orang lain atau perkongsian maklumat adalah rendah. Keputusan *structural equation modeling* (*SEM*) menunjukkan bahawa persekitaran pembelajaran ($\beta=0.150$, $p< 0.01$) dan

keperluan asas psikologi ($\beta=0.379$, $p < 0.01$) mempunyai kesan langsung terhadap pembelajaran determinasi sendiri. Seterusnya, aktiviti heutagogi memberi kesan perantara yang signifikan terhadap hubungan antara kedua-dua variabel tersebut. Dapatan temubual separa berstruktur pula menunjukkan bahawa persekitaran pembelajaran secara dalam talian ataupun teradun mempunyai kesan yang berbeza terhadap pembelajaran determinasi sendiri pelajar pasca siswazah mengikut program pengajian. Selain itu, persekitaran pembelajaran sosial yang melibatkan interaksi pelajar dengan rakan sebaya dan pensyarah memainkan peranan penting dalam pembelajaran determinasi sendiri mereka. Pelajar pasca siswazah juga didapati bermotivasi untuk pembelajaran determinasi sendiri untuk memenuhi keperluan asas psikologi mereka dari segi autonomi, kecekapan dan hubungan dengan orang lain. Implikasi kajian dari segi teoritikal dan pendidikan serta cadangan penyelidikan masa depan turut dibincangkan.

**INFLUENCES OF LEARNING ENVIRONMENT AND BASIC
PSYCHOLOGICAL NEEDS ON SELF-DETERMINED LEARNING OF
POSTGRADUATE STUDENTS: THE MEDIATING EFFECTS OF
HEUTAGOGICAL ACTIVITIES**

ABSTRACT

This study aims to investigate the influence of the learning environment and basic psychological needs on self-determined learning among postgraduate students. The mediating effect of heutagogical activities on the relationship between these two variables was also examined. A mixed-methods study was conducted at a research university in Malaysia to achieve the research objectives. A total of 664 postgraduate students were sampled through an online questionnaire. Four highly valid and reliable instruments were used to collect data namely Postgraduate Self-Determined Learning Questionnaire, Learning Environment Scale, Basic Psychological Needs Satisfaction Scale, and Heutagogical Activities Scale. Next, qualitative data were obtained through semi-structured interviews with 28 postgraduate students. Descriptive analysis results showed that postgraduate students had a high level of self-determined learning ($M=3.18$; $SD=0.41$). The involvement of students from medical, dental, and health, engineering, and arts programs in explore heutagogical activities was high, while their participation in learning activities requiring connection with others and information sharing were low. The structural equation modeling (SEM) results indicated that the learning environment ($\beta=0.150$, $p< 0.01$) and basic psychological needs ($\beta=0.379$, $p< 0.01$) had a direct effect on self-determined learning. Furthermore, heutagogical activities had a significant mediating effect on the relationship between these two variables. Semi-structured interview findings revealed that online or blended learning

environments had different effects on postgraduate students' self-determined learning depending on their program of study. Additionally, social learning environments involving peer and lecturer interaction played a significant role in their self-determined learning. Postgraduate students were also found to be motivated for self-determined learning to fulfill their basic psychological needs in terms of autonomy, competence, and relatedness. The theoretical and educational implications of the study, as well as suggestions for future research, are also discussed.

CHAPTER 1

INTRODUCTION

1.1 Introduction

This chapter gives an overview of the emergence of self-determined learning in the current paradigm of teaching and learning. As self-determined learning emerges in the educational world, the notion of teaching and learning specifically at higher education context has been given a transformative lift which aims to shift pedagogy to highly student-centred learning so that graduates remain substantially competitive in the fast-growing era. The shift in educational paradigm has postulated the need to strengthen the practice of self-determined learning at higher education sector. Therefore, it is crucial to recognise the implementation of self-determined learning because its notion of capability development is set to tally with the learning outcomes outlined in the higher education aspiration. The current study intends to investigate the actual phenomenon of self-determined learning being implemented in the context of Malaysian higher education.

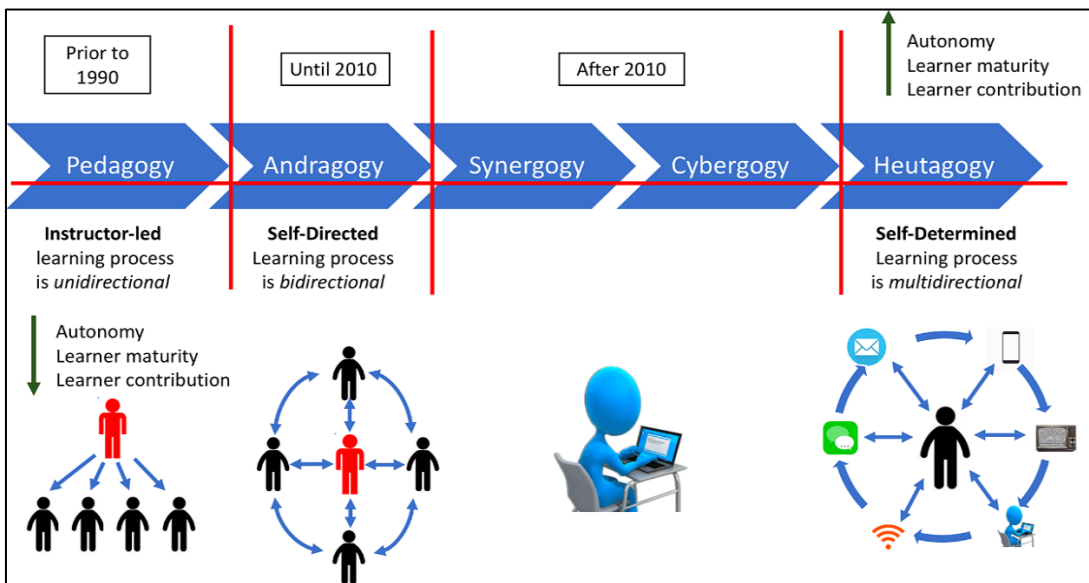
1.2 Background of the Study

Prior to 1990, pedagogy first emerged as the art and science of teaching children, which focuses on the transfer of knowledge from teachers to students with deliberately structured learning objectives and outcomes through sets of instructional strategies and direct instruction, aiming to fulfil the specific assessment criteria (Friesen & Su, 2023; Hinchliffe, 2001). Pedagogy is known as an instructor-led

paradigm which means that the learning process is unidirectional. In other words, the learning is facilitated by knowledgeable individual such as teachers’ direct transmission of knowledge to students where the classrooms are completely dominated by teachers (Mirete et al., 2020; Skerry et al., 2013). In view of the design of curriculum, teaching methods, and assessments are entirely decided by teachers (Ahmed, 2013), students do not have control in their own learning in traditional classrooms, hence they become passive recipients who are required to take in teachers’ knowledge. Often, students are also expected to learn through memorisation, repetition of information, and regurgitation of information transmitted by the teacher (Cicuto & Torres, 2016). Figure 1.1 illustrates the evolution of learning theories from pedagogy to heutagogy.

Figure 1.1

Learning Theories



Note. Reprinted from “Changing paradigms of bedside clinical teaching,” by I. Ratnani, S. Fatima, A. Mithwani, J. Mahanger, and Z. Surani, 2020, *Cureus*, 12(5), p. 2. Copyright 2020 by Cureus.

Even though pedagogy and andragogy share some similarities, directly links to the teaching of children, Knowles et al. (2020) argues that adult learning extended the core principles of pedagogy. Therefore, Knowles (1980) posited andragogy or Adult Learning Theory as the art and science of facilitating adult learning. It formulates the concepts of self-directedness, explaining how adults learn in higher education. As a result, a revolution of paradigm shift has occurred within the context of higher education on how adult learners in the twenty-first century learn in which its pedagogical philosophy forgoes teacher-centred learning and controlled dissemination of knowledge to welcome student-centred learning (Colet, 2017). Such shift is necessary as adult learning theory states that the ways adult learners learn differently from children as the former should be able to relate their prior knowledge and experiences to the new learning content (Knowles et al., 2020).

In andragogy also known as self-directed learning, adult learners shift from dependency to directing their own learning through sequential activities designed by instructors to develop full potential (Knowles, 1984; McGrath, 2009). By challenging and reforming the norm of adult education, andragogy has made scholars and practitioners ponder about the supposition on adult teaching approaches (Knowles, 1990). One of the major differences that make adult education distinctive from traditional education is the learning process that allows knowledge exchange among teachers and learners because adult learners' experience is equally important to teachers' knowledge (Knowles et al., 2020). It means that self-directed learning emphasises on bidirectional learning in which the transmission of knowledge can occur between teacher and students and students and students.

To date, the drastic growth of technology has accelerated the demand of more effective teaching and learning, aiming to develop learners with high capabilities. To achieve the goal of fostering autonomous and capable learners in meeting the need of IR4.0 and rapid changes in society, learners are expected to be responsible for the creation of knowledge, building learning experiences, and determining the learning path (Blaschke & Hase, 2019; Kim et al., 2022; Schwier et al., 2009). In other words, discipline-based knowledge from traditional practices is no longer adequate and appropriate for learners in contemporary communities and workplaces which require high capabilities (Uday, 2019). Since andragogy only focuses on competency development, it is no longer substantial for learners to thrive in higher education with the rapidly growing technology where numerous resources are freely accessible (Blaschke et al., 2014). Even though andragogy gives learners flexibility in the learning context, it is no longer substantial in the current education paradigm because most of the learning processes and tasks are still teacher-centered with limited exposure to real-world involvement experienced under teacher-centric curricula designed based on andragogical principles (Hase & Kenyon, 2007; 2013).

Consequently, cybergogy has emerged as a new learning paradigm which emphasises on the synergy between the fundamentals of andragogy and pedagogy, centering online learning with information and communication technologies (Muresan, 2014). During the same time, heutagogy has already been developed. The concept of cybergogy is in line with one of the core principles of heutagogy which is known as non-linear learning. Cybergogy gives rises to heutagogy as it places emphasis on technology-based learning. With the implementation of cybergogy, learners are given plenty of opportunities to independently direct their learning and achieve learner-centered learning, particularly through collaborative models and

communities in virtual environment with the use of the Internet and social media (Sumarsono, 2019).

However, the rapid evolution of globalised demand in higher education has made cybergogy insufficient to fulfil the aim of producing capable learners. To fill up the gap and accommodate the changes, the teaching and learning paradigm in higher education context has moved towards heutagogy in Australia since its inception in 2000, a teaching framework based on self-determined learning which acts as an extension that integrates andragogy (Hase & Kenyon, 2001; 2013; Stoten, 2020). Nevertheless, the initial introduction of the framework did not align well with education and technology for the support of self-determined learning.

Approximately a decade later, open education system, massive open online courses (MOOCs), social media, and open resources began to mushroom, creating the era where learners are allowed more control of what, when, and how they learn. Simultaneously, the institutional restriction on accreditation and controlled learning started to reduce (Blaschke, 2014). With the unfolding transformation of higher education, heutagogy places great emphasis on the concept that learning is multidirectional whereby learning can possibly take place in various forms.

One of the many features of heutagogy includes the integration of interactive multimedia and technologies into the process of teaching and learning. In this case, the concept of cybergogy, which emphasises on learning with technologies is integrated with heutagogy that postulates the development of learners' self-determined learning in a non-linear learning environment. Instead of learning from teachers alone, the learners are now able to learn with multiple approaches anytime and anywhere. Heutagogy highly emphasises the more active role of student in determining what to

learn according to their individual needs and interests (Glassner & Back, 2020), with the facilitating support by the instructor. In recent years, a transformation from andragogy to heutagogy has been underway in higher education especially postgraduate education.

In Malaysian education context, the implementation of heutagogical approach has been gaining attention because the local policies have greatly called for autonomous learning among tertiary level students (Malaysia Education Blueprint, 2015; Tham & Chong, 2023). Such revolution calls for students' initiative to determine the way they learn because the gain of information can now take place outside the formal learning context (Blaschke, 2016). It is believed that the shift from andragogy to heutagogy suits learners' needs appropriately in the 21st century because the relevance of self-determined learning is highly recognised in the fast-growing digital age in which a vast amount of information and resources are readily accessible with the use of technological gadgets and internet connection (Patel, 2018).

The need for the transformation from self-directed learning (andragogy) to self-determined learning (heutagogy) explains that teacher's dominant role is minimised by allowing learners with greater learner autonomy, individual work time, and more freedom in managing their own learning. The role of educators and learners are gradually exchanging as learners are expected to become autonomous while educators reduce their controlled authority and act as facilitators throughout the learning process. In short, the form of teaching and learning paradigm has since transformed traditional to innovative approaches from the past to present.

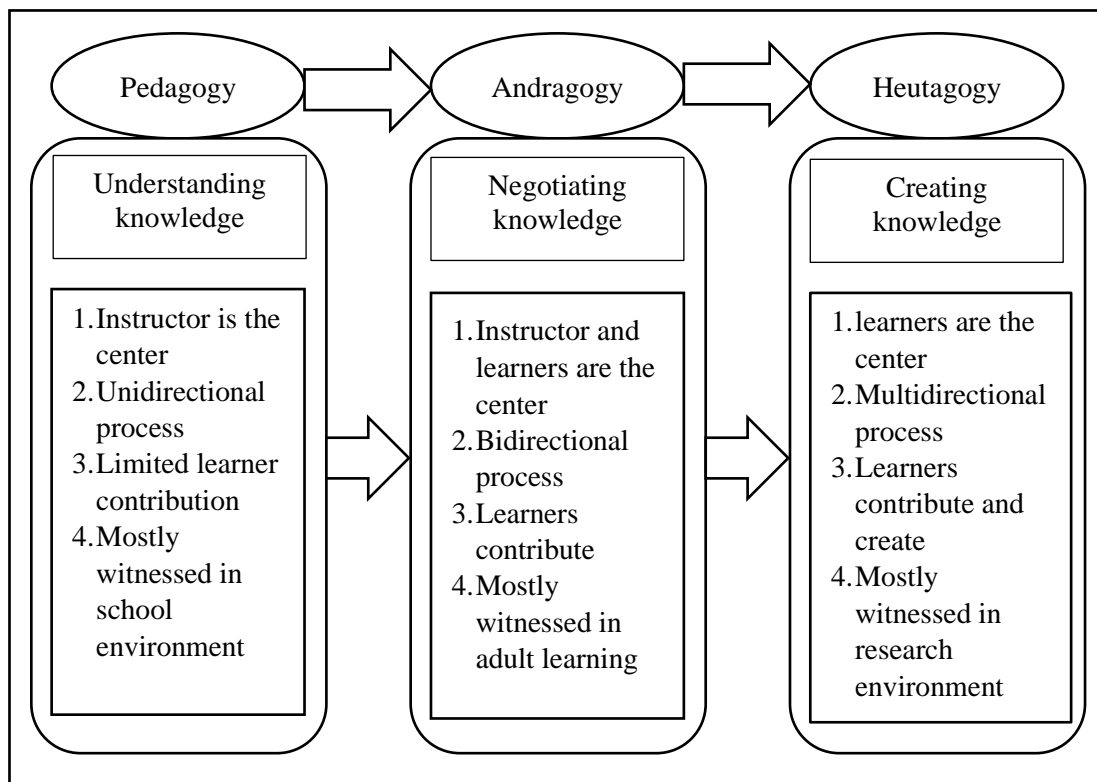
Scholars explain that self-determined learning can be fostered through heutagogical approach. According to Hase and Kenyon (2013), heutagogical approach

not only aid learners in achieving high academic performance, but also it encourages learners venture into further studies. By seeing its differences from pedagogy and andragogy, heutagogical approach focuses on the contribution and creation of knowledge. The said approach also highlights the importance of learners being placed at the central point of the learning process. In higher education, learners are required not only to develop competencies but also to create knowledge, especially postgraduate students who are directly involved in research activities. They are expected to think critically as in mastering the act of evaluating, using, and creating knowledge through the cultivation of epistemic cognition, as the latter is needed when they need to go beyond simple memorisation of information such as deciding the most appropriate solution to the complex problems (Greene & Yu, 2016).

Hence, heutagogical approach is mostly witnessed in research environment and it is believed that such approach is highly applicable to postgraduate programmes which require students to carry out research-related work in the respective discipline, create new knowledge, and contribute further literature to the studied phenomenon. To be specific, heutagogical approach aims to develop self-determined learning among students. Figure 1.2 summarises the differences between the concepts of pedagogy, andragogy, and heutagogical approaches in teaching and learning.

Figure 1.2

Essences of Pedagogy, Andragogy, and Heutagogy

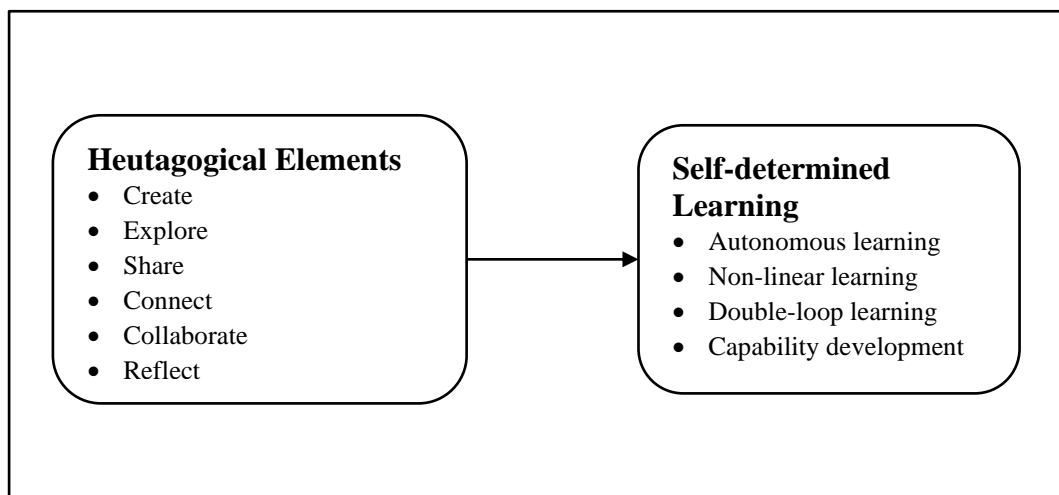


In the context of contemporary higher education teaching and learning, heutagogical approach is known as a form of self-determined learning in which the term can be used interchangeably (Blaschke & Hase, 2016; Blaschke et al., 2014; Hase & Kenyon, 2013; Lynch et al., 2021). Heutagogical approach is guided with several core principles which serve as its pillars in promoting self-determined learning thus producing self-determined learners. Figure 1.3 illustrates the overall constructs of heutagogical approach which is comprised of four principles (student-centred learning, non-linear learning, double-loop learning, capability development) and six design elements (explore, create, connect, collaborate, share, reflect) underlying heutagogical learning activities. Heutagogical learning activities can be guided by six elements to foster self-determined learning among postgraduate students. In higher education, learners are exposed to activities which incorporate the six elements for the

development of self-determined learning. By practising the six heutagogical activities, learners can enhance their self-determined learning in four principles namely, autonomous learning, non-linear learning, double-loop learning, and capability development, during their learning process.

Figure 1.3

Principles and Elements of Heutagogy



Since 2015 in Malaysia, MOHE has directed its goal to cultivate student-centered approaches and increase the opportunities for self-directed learning through the implementation of lifelong learning (Malaysia Education Blueprint, 2015, p.110). Several key policies including the National Philosophy of Education, Malaysian Education Development Plan (Higher Education) 2015-2025, the Future of Curriculum Philosophy and the National Higher Education Strategic Plan 2020 were designed to implement heutagogical approach in Malaysian higher education (Tajudin et al., 2020). Besides that, the ministry also increases interconnectivity, Internet of Things (IoT), Artificial Intelligence (AI), automation as well as promotes the use of ICT inside or outside classrooms for learning purposes which facilitates non-linear learning among students (Tully & Sidin, 2019). At the same time, learners are

encouraged to be reflective by constantly thinking about the problems and solutions critically, leading to double-loop learning. Other than that, the policies aspire to produce human resources with profound capabilities including effective communication skills, great teamwork, high self-efficacy which are the characteristics reflected in the capability development of heutagogy (Ministry of Education Malaysia, 2015; The National Higher Education Action Plan 2011-2015).

As Industry 4.0 emerges, the globalised revolution is expected to exert significant impacts on a wide range of fields including manufacturing, education, technology, workforce recruitment, and so on (Maria et al., 2018). To keep up with the revolutionary transformation of IR 4.0, learners in the educational field are required to become highly autonomous and capable in applying competencies and skills in various situations versatily (Kim et al., 2022). With the surging demand of adult learners pursuing postgraduate degrees, it is important to come out with a learning approach which caters their varied individual needs (Moore & Fodrey, 2018; Stoten, 2020). Such transformations have reemphasised the novel concept of heutagogy in the education contexts. Having to develop from the study of self-determined learning, the notion of heutagogy has gained great attention and become a widely accepted approach in the higher education worldwide (Canning, 2010; Halsall et al., 2016). In Malaysia, the Ministry of Higher Education (MOHE) has started paving its path towards the Education 4.0 within the higher education system.

One significant move by the MOHE was the formation of Malaysian Qualification Agency (MQA). With the aim of making sure the accreditation of courses offered by the educational institutions, Malaysian Qualification Framework (MQF) was produced (Malaysian Qualification Agency, 2017). Based on the updated

MQF, it aims to form a great connection between the enhancement of learners' competencies and lifelong learning. Hence, Outcome-Based Education (OBE) system was implemented by the agency to transform traditional prescription-based learning to outcome-oriented learning (Karim & Khoo, 2013) as well as manage teaching and learning instructions at higher education institutions (Mohayidin et al., 2009). The overall learning achievement in master's and doctoral degree postulated by MQF highlights the inclusion of 11 programme learning outcomes graduates are expected to attain upon the completion of study.

The attainment of 11 programme learning outcomes and enhancing learners' competencies can be highly associated with one of the core principles of self-determined learning that emphasises learners' capability development. As heutagogical approach aims to develop self-determined learners, learners are expected to be capable in applying their competencies in various new or different situations. The set of competencies includes 21st century skills which are mostly aligned with the 11 programme outcomes written in MQF such as knowledge and understanding, cognitive skills, practical skills, interpersonal skills, communication skills, digital skills, numeracy skills, leadership, autonomy and responsibility, personal skills, entrepreneurial skills, and ethics and professional. The situation indicates that higher education systems put constant efforts to keep abreast of the societal changes. In other words, higher education institutions are expected to foster graduates' professional talents who are capable to fulfill the ever-changing industrial demands. The ultimate goal is set to develop students into capable workers who can cope up with upcoming challenges and difficulties at the workplace. The aspiration of MQF is aligned with the notion of self-determined learning to develop learners with capabilities.

Generally, learning environment is regarded as one of the prominent factors which determine the development of students' learning. The phenomenon is evident in the previous studies that have shed light on the impact of learning environment on the quality of learning (Abdullah, 2020; Bjork & Linn, 2006; Bruno & Dell'Aversana, 2017). Specifically, Bruno and Dell'Aversana (2017) suggested that learning environment yields influence on both learning approaches and learning outcomes. The study concluded that the extent of students' responsibility in the learning environment determined the cultivation of meaningful learning. When the learning environment involves research projects and heutagogical design elements such as feedback for reflection, it motivates students to develop strategies to thrive in the course or make individual decision in their learning process.

The influence of learning environment on capability development, a principle of self-determined learning can be seen in a study by Kember and Leung (2005). The study emphasised that teaching and learning environment exerted a strong influence toward the development of students' generic capabilities during their study period. The researchers proposed the need to explore the possibility whether capability development can be affected due to the nature of teaching in the programmes. It shows that the environment is important for students' learning experience because it could alter the ways they learn and develop capability which includes 21st century competencies such as higher order thinking, communication, collaboration, and technology to name a few. Contextual elements within clinical environment complicates the effectiveness of teaching and learning as the patterns of teaching and learning depend on the changes in context (Hoffman & Donaldson, 2004). The results highlighted that different learning patterns are adapted by learners to balance their needs in the environment of medical discipline. Hence, it is evident that the influence

of learning environment on students' learning is said to be undisputable as claimed in many existing studies (Closs et al., 2022; Deemer et al., 2023; Rusticus et al., 2023).

Other than environmental factors, previous studies have also found the association between internal factors and learning. Biggs (2003) stated that students' motivation can be one of the crucial factors to students' learning outcomes. Ryan and Deci (2020) denote that self-determination theory (SDT) highlights that how individual's inherent motivational behaviours for learning can be supported and his or her need supports promote intrinsic motivation and internalisation. Intrinsic motivation determines students' behaviours in managing their own learning. In this context, postgraduate students need to have sufficient intrinsic motivation to take control of their learning particularly research-related activities which require extensive autonomy. Therefore, given the importance of intrinsic motivation postulated in SDT, basic psychological need satisfaction is crucial and acts as the pre-requisite for intrinsic motivation (Klaeijssen et al., 2018; Niemic & Ryan, 2009). According to Deci and Ryan (2000), basic psychological needs refer to the need for autonomy, competence, and relatedness. To put it another way, learners' all three basic psychological needs must be fulfilled to sustain their intrinsic motivation to achieve more effective learning.

Learners' willingness to take charge over their learning is associated with the success of their learning at the end of the process (Bruno & Dell'Aversana, 2017). In other words, it is important to take into consideration of learners' engagement in learning was directly influenced by their psychological needs (Dincer et al., 2019). It is likely for learners to become more engaged in learning when their basic psychological needs are fulfilled (Ryan & Deci, 2000b; 2009). It is supported by a study by Froiland and Worrell (2016) who found that intrinsic motivation could predict

student engagement in learning. When students lack motivation, it may negatively affect their self-directedness in learning as motivation acts as the catalyst that facilitates the conduct of self-directed learning activities (Toit-Brits & Zyl, 2017). A systematic review by Wong et al. (2021) also pointed that self-directed learning development is dependent on environmental and personal factors. Therefore, the present study proposed both learning environment and psychological factors to be considered as the factors which influence students' self-determined learning.

1.3 Statement of Problem

Postgraduate students are expected to determine what and how their learning and research activities should occur (Blaschke & Marin, 2020; Chan et al., 2024; Hase & Blaschke, 2021). It is predominantly observed in research environments, particularly evident and relevant at the postgraduate level, where research activities are intensive (Uday, 2019).

Although policies have proposed numerous strategies and programmes to enhance excellence in higher education, studies related to the practices of heutagogical approach in Malaysian higher education context are relatively limited (Eachempati et al., 2017; Malek, 2017; Mohaffyza et al., 2020; Mohammad et al., 2019; Tiew & Abdullah, 2021). In Malaysia, what adds to the problem is that many university curricula inhibit the development of self-directed learning (Nasri et al., 2020). There are obstacles yet to overcome for the incorporation of self-determined learning into a formal and predetermined learning environment, where educators still hold the major role in students' learning process. Many students struggle with self-management and

self-directed learning skills, and a significant portion encounter hurdles in managing their time effectively (Liu & Xiao, 2019).

Therefore, there appears a gap in literature because most previous studies only focus on students' level of self-directed learning readiness (Agonács & Matos, 2019a; Clark, 2021; Geng et al., 2019; Lim et al., 2018; Mabaso et al., 2023; Tekkol & Demirel, 2018; Uz & Uzun, 2018) and particularly lots of studies on undergraduate education (Abdou et al., 2021; Alharbi, 2018; Dogham et al., 2022; Koirala & Kafle., 2021; Kunjukunju et al., 2022; Rascón-Hernán et al., 2019; Singh & Paudel, 2021; Slater et al., 2017). Most studies have not been conducted to determine the level of self-determined learning among postgraduate students (Stoten, 2020). Consequently, the problem of limited studies highlights the lack of instrument to measure postgraduate students' level of self-determined learning, which puts forward the need to investigate the level of self-determined learning among postgraduate students.

Due to the limited research and lack of knowledge, the status about the practices of heutagogical activities among postgraduate students to promote self-determined learning is not clear in the local context. Previous studies have investigated the practices of heutagogical activities in Malaysian higher education (Mohafyyza et al., 2020; Putra et al., 2020; Yunos et al., 2020) but they were not done according to different disciplines. As not much is known about the implementation of heutagogy in different disciplines, it remains a possibility that the heutagogical learning processes may vary across postgraduate students from different disciplines. Differences may be seen in the heutagogical learning activities adopted by postgraduate students from different disciplines. For instance, students in medical field may practise problem-based learning (Fan et al., 2018; Lim, 2023; Shimizu et al., 2019; Trullàs et al., 2022)

and project work is generally practised by engineering students (Huang et al., 2023; Sukacké et al., 2022; Uotila et al., 2023). For that reason, there is a need to conduct studies to explore the practice of heutagogical activities in different disciplines.

The studies about self-determined learning are relatively limited in Malaysian higher education context. Although literature reports that generally postgraduate students face certain obstacles in their learning process which lead to the negative effects towards their emotional and self-management ability (Teoh et al., 2019), there is still a lack of understanding on the factors influencing self-determined learning among postgraduate students. Past studies have shown that environmental and psychological factors influence self-directed learning (Beach, 2017; Munasinghe et al., 2019; Ryan & Deci, 2000a; Uz & Uzun, 2018; Zhu, 2022; Zhu et al., 2022), but most studies were carried out in relation to self-directed learning in foreign context. Little empirical evidence can be seen regarding the factors affecting students' self-determined learning as most studies in foreign context have only focused on the factors influencing self-directed learning (Kim et al., 2021; Lasfeto, 2020) and self-directed learning readiness (Leatemala et al., 2016; Monkaresi et al., 2015; Slater & Cusick, 2017; Song & Bonk, 2016). In contrast, little is known about the scenario in Malaysian context due to the limited studies investigated factors contributing to students' self-directed learning readiness (Ahmad & Majid, 2010; Lim et al., 2018; Siddiqui et al., 2021). The limited studies investigating the factors affecting self-determined learning in both international and local higher education contexts (Ahmad & Ghapar, 2019; Esmacil et al., 2024; Hamdan et al., 2021) suggested the lack of model explaining the influences of learning environment and psychological factors on self-determined learning in postgraduate education. This results in lack of understanding about the factors influencing self-determined learning in postgraduate education. Therefore,

there is a need to investigate the influence of environmental and basic psychological needs factors towards postgraduate students' self-determined learning.

Review indicated that limited studies investigated the practice of heutagogy in Malaysian higher education (Ibrahim et al., 2022; Karim et al., 2021; Mohafyyza et al., 2020; Putra et al., 2020; Yunus et al., 2020). As the studies only employed descriptive statistics to describe the frequency of heutagogical activities practised by students from a technical university. The explanation and understanding on the heutagogical learning activities under the influence of environmental or psychological factors was limited. The limited studies in the local context suggest the need to understand how environmental and psychological factors influence self-determined learning of postgraduate students.

Although some studies have shown that teachers' choice of teaching approaches (Bagheri et al., 2013; Gerard et al., 2022) and learning environment exerted direct effect on students' self-directed learning readiness (Kek & Huijser, 2011; Manuaba et al., 2022), the understanding of the influence of certain learning environments such as physical class or online class on self-directed learning is still insufficient. The literature explains that the application of heutagogy is still not evident in certain fields of studies such as science, engineering, and mathematics (Agonács & Matos, 2019c), revealing limited studies on the use of heutagogy in art programmes. So, the current study intends to investigate the influence of learning environment on postgraduate students' self-determined learning in different disciplines.

As indicated in previous studies, it remains uncertain in terms of the effect of basic psychological needs on postgraduate students' self-determined learning. Often, studies related to factors of students' self-directed learning are always constrained to

undergraduate level (Buch et al., 2021; Manuaba et al., 2022; Pratama et al., 2022; Sumuer, 2018; Visiers-Jiménez et al., 2022), leaving uncertainty in postgraduate education. Understanding the influence of postgraduate programmes in different disciplines on postgraduate students' self-determined learning is crucial as the differences may exert different extent of effect towards postgraduate basic psychological needs and level of self-determined learning. Therefore, this study aims to investigate how basic psychological needs affect postgraduate students' self-determined learning in different disciplines.

Studies have asserted the importance of teachers' perspectives regarding self-directed learning (Gerard et al., 2022; Mercader & Gairín, 2020; Nasri, 2017), but little is known about self-determined learning from students' perspectives. Therefore, this study recognised the need of understanding the contemporary practice of heutagogical activities in postgraduate education as well as the factors that influence the development of self-determined learning among postgraduate students. This study aims to delve into students' perspectives on the integration of heutagogical activities into their learning process and to explore how the factors influence self-determined learning within the context of postgraduate education.

1.4 Research Objectives

1. To identify the level of self-determined learning among postgraduate students.
2. To determine the heutagogical activities among postgraduate students from different programme clusters.

3. To determine the influence of learning environment and basic psychological needs on postgraduate students' self-determined learning.
4. To determine the mediating effect of heutagogical activities on the relationships between the learning environment, basic psychological needs, and self-determined learning.
5. To understand how learning environment influences postgraduate students' self-determined learning in different programme clusters.
6. To understand how basic psychological needs influence postgraduate students' self-determined learning in different programme clusters.

1.5 Research Questions

1. What is the level of self-determined learning among postgraduate students?
2. What are the heutagogical activities practised by postgraduate students in different programme clusters?
3. What are the learning environment and basic psychological needs that influence self-determined learning of postgraduate students?
4. What are the mediating effects of heutagogical activities on the relationships between the learning environment, psychological needs, and self-determined learning?
5. How does learning environment influence postgraduate students' self-determined learning in different programme clusters?
6. How do basic psychological needs influence postgraduates' self-determined learning in different programme clusters?

1.6 Hypotheses

- H₁ : Heutagogical activities have a significant direct effect on postgraduate students' self-determined learning.
- H₂ : Social learning environment has a significant direct effect on heutagogical activities.
- H₃ : Social learning environment has a significant direct effect on postgraduate students' self-determined learning.
- H₄ : Basic psychological needs have a significant direct effect on heutagogical activities.
- H₅ : Basic psychological needs have a significant direct effect on postgraduate students' self-determined learning.
- H₆ : Social learning environment has a significant indirect effect on self-determined learning via heutagogical activities.
- H₇ : Basic psychological needs have a significant indirect effect on self-determined learning via heutagogical activities.

1.7 Significance of Study

This study focusses on the novel findings about self-determined learning within postgraduate education. The findings on levels of self-determined learning provided empirical evidence on self-determined learning at the postgraduate level, thus contributing to the addition of literature to the heutagogy education. To fill the gap of limited studies and knowledge in self-determined learning, this study contributes to the novel knowledge and valuable addition of empirical evidence for the measure of self-determined learning as there is no baseline data on the instrument which examines the four major principles of heutagogy altogether namely, autonomous learning, non-linear learning, double-loop learning, and capability development, from the lens of Malaysian postgraduate education.

Besides, the second significance is understanding the practices of heutagogical activities among postgraduate students from different programme clusters is crucial as it can provide valuable insights into the specific learning practices of heutagogy in each programme cluster for the development of self-determined learning, which is deemed important in postgraduate education that places a great focus on research-oriented activities and knowledge creation. The findings contribute to the connection between unique nature of programme clusters and the students' practices of heutagogical activities in postgraduate education. By identifying the dominant practices of heutagogical activities in each programme cluster, the higher education institute can design a more focused postgraduate modules that encourage the six heutagogical activities in different programme clusters, with aims to foster learner autonomy postgraduate students in their learning. At the university level, there is a need for the programme developers from different disciplines to appreciate the importance of reviewing the available learning resources and methods of delivery to keep students motivated and interested in learning independently throughout the learning process (Mala-Maung et al., 2007). Besides that, the university can also relook at the curriculum to better promote heutagogical activities of postgraduate students. It can help lecturers to design lesson plans or teaching modules which promote students' self-determined learning effectively when engaging in classroom activities, assignments, and research-related work.

Furthermore, this study produced a model which explained the effect of internal factor, external factor, and mediating factor on self-determined learning in postgraduate education. The findings confirmed the mediation effect of heutagogical activities on the relationship between (1) learning environment and self-determined learning and (2) basic psychological needs and self-determined learning. The study

also gathered in-depth understanding about the internal and external factors affecting postgraduate students' development of self-determined learning. The perspectives shared by the participants through interviews can be used to understand how learning environment and psychological factors affect self-determined learning of postgraduate students from different programme clusters. The findings suggest the importance of postgraduate students' social interaction with peers and lecturers, as they exert significant effect on their self-determined learning. Moreover, the findings suggest the significance of basic psychological needs. It is crucial to ensure postgraduate students maintain their intrinsic motivation during their studies.

1.8 Definition of Terms

1.8.1 Self-determined Learning

Self-determined learning, also known as Heutagogy, can be understood as a theory of learning that encourages learners to experience and practise independent learning through making discoveries. (Blaschke & Marín, 2020; Hase & Kenyon, 2001). It is an extension of andragogy approach with greater emphasis on learner's autonomy in learning and knowledge creation within a technology-based learning environment (Blaschke & Hase, 2016). It is a critical skill in postgraduate education as students are self-determined learners who actively involved in learning and research activities for knowledge creation and capability development (Uday, 2019). In self-determined learning processes, students are placed at the central point of learning experience and they take full responsibility and control of the learning which includes what is to be learned, how it is carried out, and the learning time (Blaschke & Hase, 2019; Hase, 2011; Hase & Blaschke, 2021). Self-determined learning has four core

principles namely autonomous learning, non-linear learning, double-loop learning, and capacity development (Blaschke et al., 2014; Hase & Kenyon, 2013).

In this study, postgraduate students' self-determined learning is measured by the Postgraduate Self-Determined Learning Questionnaire (PSLQ) developed from several sources (Cheng et al., 2010; Kember et al., 2000; Macaskill & Taylor, 2009; Teo et al., 2010; Williamson, 2007). The PSLQ measures self-determined learning as a four-factor construct, which is in line with the four underlying principles of heutagogy. The instrument consists of 42 items with four-point Likert scale made up of four subscales namely, Autonomous Learning Subscale, Non-Linear Learning Subscale, Double-Loop Learning Subscale, and Capability Development Subscale. The overall Cronbach's alpha value of PSLQ is $\alpha = 0.95$. Postgraduate students' level of self-determined learning is divided into three levels based on cut-off points: high ($M = 2.67-4.00$), moderate (1.34-2.66), and low (0-1.33).

1.8.1(a) Autonomous Learning

Autonomous learning explains that learners act as the most important agent who takes major responsibility in the educational experience by making decision on what and how to learn in the learning process (Hase & Kenyon, 2007, 2013). In this study, the notion of autonomous learning was guided by the concepts of learner autonomy whereby students take responsibility for their own learning (Holec, 1981).

In the present study, the Autonomous Learning Subscale measures autonomous learning among postgraduate students. In autonomous learning, students have the autonomy to choose how and what they want to learn. The subscale consists of 10 items with four-point Likert scale that gauge postgraduates' autonomy in setting their

learning goals, determining research topics that interest them, and meeting their learning needs during study. It also measures their self-directedness in making decisions, planning, keeping track of own progress and engaging in discussions with others (e.g., supervisors, researchers, peers) to promote own learning and research. The items were adapted from Autonomous Learning Skill (Macaskill & Taylor, 2009). The Cronbach alpha's value for Learner-Centred learning Subscale is $\alpha = 0.84$.

1.8.1(b) Non-linear Learning

As self-determined learning aligns perfectly with non-linear design and learning approach, learning is no longer restricted to formal settings and can take place anywhere and anytime with the support of Web 2.0 technologies (Hase & Kenyon, 2013; Oliver, 2016). Web 2.0 technologies cover a wide range of online applications (Lenao, 2023; Ribière et al., 2010) for example social networking sites, Research Gate, webinar, and online forum.

In this study, a total of 10-items with 4-point Likert scale in Non-linear Learning Subscale is designed by adapting an instrument from Teo et al. (2010) titled Self-directed Learning with Technology Scale (SDLTS) to investigate postgraduate students' level of non-linear learning. The subscale aims to gauge postgraduate students' use of online platforms and apps to learn, share and discuss their academic and research work, engage with others (e.g., supervisor(s), researchers, librarians, peers, relevant stakeholders) and to disseminate their research work. The items were adapted from the Self-directed Learning with Technology Scale (SDLTS). The Non-Linear Learning Subscale displays a Cronbach's alpha value of $\alpha = 0.88$.