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The Practice of Heutagogy, Peeragogy and Cybergogy Approach among Vocational College Instructors

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Abstract

This study investigates the implementation levels of Heutagogy, Peeragogy, and Cybergogy approaches among instructors at vocational colleges in Malaysia. Employing a quantitative survey research design, data were collected from a sample of 241 instructors across 15 vocational colleges, representing various Technology fields such as Automotive, Electrical, Electronic, Construction, Welding, Industrial Machining, Refrigeration & Air Conditioning, and Computer Systems & Network Technology. The sample was selected using a cluster stratified convenient sampling method. Demographic information, including gender, age, race, institutional zone, vocational college, program, experience, qualification, certificate, and class, was gathered. A structured questionnaire comprising 53 items served as the primary data collection instrument. Data analysis was conducted using SPSS software to derive frequency values, percentages, mean scores, and standard deviations. The Kruskal-Wallis and Mann-Whitney U tests were employed to identify differences in the implementation of Heutagogy, Peeragogy, and Cybergogy approaches among the instructors. The findings indicate a high level of implementation for Heutagogy and Peeragogy approaches, while the Cybergogy approach is practiced at a moderate level. Significant differences were observed in the implementation of these approaches based on the instructors' fields and teaching experience. To enhance the practice of Cybergogy, it is recommended that vocational college administrations provide training workshops or courses to improve the teaching skills of their academic staff for 21st century learning environment.

1. Introduction

Human capital serves as the wellspring of energy within organizations, contributing significantly to Malaysia's economic value (Saud, 2021; Ornek & Ayas, 2015; Baron, 2011). Structured training support enhances knowledge and skills in various fields, particularly within the service sector, where educators play a crucial role (Kamal et al., 2022; Hasami & Buang, 2018). The dynamic concept of learning encompasses the acquisition of knowledge, skills, and emotional development facilitated by educators (Ropisa & Rahimah, 2018). As global education technology evolves, curricula must adapt to meet these demands (Hui & Rosli, 2021; Chien & Denis, 2016; Schober et al., 2018). Indeed, the concept of learning refers to the method of acquiring knowledge, skills, and emotional

development of an individual facilitated by educators (Ropisa & Rahimah, 2018). The curriculum of subjects is constantly updated to align with the demands of the global education technology explosion (Hui & Rosli, 2021; Chien & Denis, 2016; Schober et al., 2018). This approach can still function effectively if implemented through self-directed learning or Heutagogy (Hafifi & Din, 2021).

Facing future challenges does not allow the Heutagogy approach to make students actively engage in receiving instructional materials. The pedagogical method can provide structured learning to educators in identifying the level of students' self-directed learning and their ability to carry out the learning process appropriately. Educators need to review learning styles that provide open opportunities and student self-control. According to Bizami et al. (2023), student's abilities can be assessed through the principles of individuals as agents, capabilities, self-reflection and double-loop learning, and non-linear principles.

Meanwhile, collaborative learning, known as pedagogy or pedagogy, has garnered attention in higher education due to its unique concept. This peer-to-peer learning pedagogy focuses on co-creation and learning with peers, who share their learning situations and experiences in a social, active, and continuous process (Mulholland, 2019). According to a study by Suhaimi et al. (2021), five thematic criteria have been identified in pedagogy: distributed and non-linear learning, context as the center of teaching, meta-learning as a source, peer feedback, and shared motivational support. The domain of Cybergogy has been re-examined based on the suggestions of Wang and Kang (2006). The cognitive, emotional, and social domains must all collaborate for effective learning and teaching. Through the domains of the approach, implementation can be more effective when practiced efficiently. In other words, Cybergogy is a learning approach that uses virtual learning environments to develop students' cognitive, emotional, and social skills (Wenno, 2021). Table 1 shows the principles and aspects of education 4.0.

Table 1 *Principles and aspects of education 4.0. (Bizami et al.,2023)*

Mode	Principles/Criteria/Factors	Aspect
Heutagogy	Individuals as agents	Autonomy and personal character
	Ability	Self-involvement with curriculum activities and digital skills
	Self-reflection & double loop learning	A reflective learning environment and thinking process
	Non linear	Dynamic process
Peeragogy	Context as the center of teaching	Personal contribution of ideas
	Meta-learning as a source	Syllabus selection and analysis aspects of knowledge
	Peers provide feedback	Feedback from members and expert engagement
	Learning is distributed and non-linear.	Information at your fingertips, flexibility aspect and asynchronous learning
	Mutual motivational support	Knowledge sharing in various communities, races and social
Cybergogy	Cognitive	Critical thinking, satisfaction and formative assessment.
	Emotive	Autonomy, satisfaction and culture.
	Social	Collaborative, engagement, personal choice and social environment.

2. Methodology

The methodology of the study will detail comprehensively all processes carried out by the researcher regarding the selected study. This section discusses the methods used in conducting the study such as conceptual design, sample population, types of instruments, procedures, and methods of data analysis. Additionally, this section provides an explanation of the procedures for conducting the study until the objectives are achieved. The methodology section serves as one of the guidelines in designing a study regarding the level of knowledge and attitudes towards heutagogical learning approaches among vocational college instructors until all objectives are achieved.

This study adopts a quantitative research design, utilizing a survey as the primary research method. Quantitative research is essential for elucidating relationships between variables (Creswell, 2014), allowing examination of how variables impact each other within the study (Creswell, 2009). Researchers conducting quantitative studies analyze data through statistical methods, comparing variables and exploring group

relationships. In this study, both descriptive and inferential statistical analyses are employed to collect respondent data, followed by hypothesis testing to address the research questions.

Regarding the study population and sample, the researcher selected 15 vocational colleges around Malaysia. To determine the total study population, the researcher has referred to the School Profile on the official portal belonging to the Ministry of Education Malaysia. Guided sources of documents obtained, the researcher will use random sampling to organize vocational colleges by zone. Then, cluster random sampling was used to select three vocational colleges. On the stratified random sampling, the researcher chooses only five respondents for each program. While for the systematic sampling technique through a list of names of respondents. In the first stage, the researcher employed a simple random sampling method based on the number of states in Malaysia. There are 14 states in Malaysia, encompassing 83 vocational colleges. The second stage involved cluster sampling in selecting zones randomly. The researcher applied a cluster sampling technique by grouping the involved vocational colleges into five zones, namely Northern Zone, Central Zone, Eastern Zone, Southern Zone, and Borneo Zone. Therefore, the researcher chose only three vocational colleges that have a significant number of vocational college instructors for each zone and offer five to six technology programs. According to Sapsford and Jupp (1996), the cluster sampling technique involves selecting clusters randomly rather than individuals and is useful for studies involving large populations within vast and uniform geographical areas where lists of elements are difficult to obtain. As for the third stage, it involved stratified random sampling by selecting five individuals for each program available in the selected vocational colleges. The stratified random sampling method is suitable and easily implemented to enhance the reliability of sample representation from the population (Creswell, 2005). This sampling was conducted because the study population is heterogeneous. According to Creswell (2005), the stratified random sampling technique is used when the population does not exhibit imbalances in the characteristics of a sample. This sample size is calculated according to the ratio of the number of instructors in the vocational college, which is a total of 241 vocational college instructors involved in this study. Therefore, the total study population for 15 college vocational instructors is 601. A total of 48 instructors will be selected as a sample to represent each zone. The total sample that will be collected is 241 instructors. A total of 241 people in this sample exceeds the sample sizes stated in Krejcie and Morgan's (1970) sample size determination table, and), which has a population of 601 people, needs 234 samples.

In this study, the researcher utilize a set of questionnaire to gather research data. A total of 300 questionnaire forms were distributed to respondents for completion. For this study, the researcher elaborated and formulated questions referring to studies conducted by (Rashid et al., 2021). The researcher also referred to studies by Tawyer and Nur, (2022) and Mohamad et al., (2020) in formulating the questionnaire items. Additionally, the researcher modified the question format according to the suitability of the three main objectives and the research questions developed. Furthermore, the researcher used nominal and ordinal scales to capture the data. Data obtained through demographic items in the questionnaire can be measured and determined using a nominal scale because it is easy to use (Bakar, 2007). For this study, the researcher used a nominal scale to obtain information related to respondent demographics such as gender, age, ethnicity, teaching experience, and program. The Likert scale was used for items in section B to D, the researcher classified the mean score into three categories, namely low, moderate, and high. The researcher formulated four sections of questions in this questionnaire, namely Section A, Section B, Section C, and Section D. For Section A, the researcher obtained respondents' demographic information such as gender, age, ethnicity, teaching experience, and program. Meanwhile, the questions in Section B were formulated to identify the implementation practices of the Heutagogical approach among instructors in Vocational Colleges. Questionnaire Section C was designed to identify the implementation practices of the Peeragogical approach among instructors in Vocational Colleges. Meanwhile, Section D questions were formulated to identify the implementation practices of the Cybergogical approach among instructors in Vocational Colleges.

3. Results and Discussion

The results of the descriptive analysis show that the number of male respondents is 132 (54.8%), while the number of female respondents is 109 (45.2%). Table 2 displays the number and percentage of respondents by gender. The majority of TVET instructors consist of male instructors, totaling 132 (54.8%), compared to 109 female instructors (45.2%).

Table 2 *Number and percentage of respondents by gender*

Gender	Number	Percentage (%)
Male	132	54.8
Female	109	45.2
Total	241	100

The results of the descriptive analysis conducted to determine the number and percentage of zones in Vocational Colleges are as follows the northern zone (Perlis, Kedah, Penang & Perak) recorded 61 (25.3%)

respondents. The eastern zone (Kelantan, Terengganu & Pahang) obtained 54 (22.4%) respondents. Meanwhile, the central zone (Selangor & Wilayah Persekutuan) had 42 (17.4%) respondents. The remaining zones are the southern zone (Negeri Sembilan, Melaka & Johor), which comprised 42 (17.4%) respondents, and the Borneo zone (Sabah & Sarawak) totaling 42 (17.4%) respondents. Table 3 illustrates the number and percentage of zones in Vocational Colleges.

Table 3 *Number and percentage of vocational college by zones*

Zone	Number	Percentage (%)
North Zone (Perlis, Kedah, Penang & Perak)	61	25.3
Eastern Zone (Kelantan, Terengganu & Pahang)	54	22.4
Central Zone (Selangor & Wilayah Persekutuan)	42	17.4
Southern Zone (Negeri Sembilan, Melaka & Johor)	42	17.4
Borneo Zone (Sabah & Sarawak)	42	17.4
Total	241	100.0

Table 4 shows the number and percentage of programs/fields in Vocational Colleges. Through a related survey on programs/fields in Vocational Colleges, the research analysis found that 30 (12.4%) respondents are comprised of the Automotive Technology program. This is followed by 25 (10.4%) respondents in Electrical Technology, 17 (7.1%) respondents in Electronic Technology, 39 (16.2%) respondents in Welding Technology, and 20 (8.3%) respondents in Construction Technology. Respondents teaching the Industrial Machining Technology program total 40 (16.6%), while 1 (0.4%) respondent teaches Wood Processing & Packaging Technology, and 54 (22.4%) respondents teach Air Conditioning & Refrigeration Technology. Finally, there are 15 (6.2%) respondents teaching the Computer Systems & Networking Technology program.

Table 4 *Number and percentage of programs / fields in vocational colleges*

Program / Field	Number	Percentage (%)
Automotive Technology	30	12.4
Electric Technology	25	10.4
Electronic Technology	17	7.1
Welding Technology	39	16.2
Construction Technology	20	8.3
Industrial Machining Technology	40	16.6
Wood Processing & Finishing Technology	1	.4
Refrigeration & Air Conditioning Technology	54	22.4
Computer Systems & Network Technology	15	6.2
Total	241	100.0

In terms of teaching experience, according to Table 5 the number and percentage of teaching experience are as follows nearly 77 (32%) respondents have less than 3 years of teaching experience. Meanwhile, 52 (21.6%) respondents are teachers with 3 - 8 years of experience. Furthermore, 42 (17.4%) respondents are teachers with 9 - 15 years of teaching experience. For respondents with 16 years or more of teaching experience who answered this survey, there are 70 (29%) respondents.

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Table 5 *Number and percentage of teaching experience*

Experience	Number	Percentage (%)
Less than 3 years	77	32.0
3 – 8 years	52	21.6
9 – 15 years	42	17.4
16 years and above	70	29.0
Total	241	100.0

Table 6 shows the normality test (Kolmogorov-Smirnov) used to determine whether the study data is normally distributed or not. Based on Table 5, the normality test results yielded a p-value of .000 ($P < .05$). Therefore, it can be concluded that the data for this study is not normally distributed. Consequently, the Kruskal-Wallis H statistical test is used to determine the differences in the practice of implementing Heutagogy, Peeragogy, and Cybergogy approaches among TVET institution instructors.

Table 6 *Normality test of heutagogy, peeragogy and cybergogy implementation practice among vocational college instructors*

Kolmogorov-Smirnov			
Item	**Statistic**	**df**	**Sig.**
The practice of Heutagogy approach implementation, among teachers of TVET institutions	.096	241	.000
The practice of Peeragogy approach implementation, among teachers of TVET institutions.	.099	241	.000
The practice of implementing Cybergogy approach, among teachers of TVET institutions.	.132	241	.000

Table 7 presents the Kruskal-Wallis test used to determine if there is a significant difference between the practices of Heutagogy, Peeragogy, and Cybergogy among instructors in Vocational Colleges based on their respective Zones. A Non-Parametric test (Kruskal-Wallis) was conducted to examine significant differences among the five Zones involving various states and Vocational Colleges concerning the implementation practices of Heutagogy, Peeragogy, and Cybergogy. The results of the Kruskal-Wallis H test indicate that there is no significant difference among the five Zones of Vocational Colleges regarding the minimum scores of Heutagogy, as follows: Northern Zone (124), Eastern Zone (105.4), Central Zone (107.95), Southern Zone (129.26), and Borneo Zone (138.08) [$X2(4,N=241) = 6.916$, $p = .140$)]. However, for the minimum scores of Peeragogy, there is a significant difference among the zones [$X2(4,N=241) = 18.471$, $p = .001$)], with values for the Northern Zone (124), Eastern Zone (105.4), Central Zone (107.95), Southern Zone (129.26), and Borneo Zone (138.08). Similarly, for the minimum scores of Cybergogy, there is a significant difference among the zones [$X2(4,N=241) = 18.471$, $p = .001$)], with values for the Northern Zone (104.99), Eastern Zone (97.77), Central Zone (111.68), Southern Zone (141.67), and Borneo Zone (162.77).

Table 7 *Differences in the implementation of heutagogy, peeragogy and cybergogy approaches among vocational college instructors based on zones*

Item	Heutagogy	Peeragogy	Cybergogy
Kruskal-Wallis H	6.916	18.471	28.791
df	4	4	4
Asymp. Sig.	.140	.001	.000

Table 8 presents the Kruskal-Wallis test used to determine if there is a significant difference between the practices of Heutagogy, Peeragogy, and Cybergogy among instructors in Vocational Colleges based on their programs. A Non-Parametric test (Kruskal-Wallis) was conducted to examine significant differences among the eight fields in Vocational Colleges concerning the implementation practices of Heutagogy, Peeragogy, and Cybergogy. The results of the Kruskal-Wallis H test show that there is a significant difference among the eight programs based on the minimum scores of Heutagogy, as follows: Automotive Technology (184.08), Electrical Technology (168.7), Electronic Technology (164.18), Welding Technology (80.49), Construction Technology (115.63), Industrial Machining Technology (53.84), Air Conditioning & Refrigeration Technology (108.57), and Computer Systems & Networking Technology (195.7) [$X2(7,N=241) = 113.856$, $p = .000$)]. Similarly, for the minimum scores of Peeragogy, there is a significant difference among the programs: Automotive Technology

(187.42), Electrical Technology (161.62), Electronic Technology (100.29), Welding Technology (78.83), Construction Technology (151.35), Industrial Machining Technology (84.61), Air Conditioning & Refrigeration Technology (96.73), and Computer Systems & Networking Technology (189.50) [X2(7,N=241) = 88.164, p = .000)]. Furthermore, for the minimum scores of Cybergogy, there is a significant difference among the programs: Automotive Technology (167.88), Electrical Technology (138.82), Electronic Technology (92.50), Welding Technology (48.73), Construction Technology (147.58), Industrial Machining Technology (126.13), Air Conditioning & Refrigeration Technology (104.67), and Computer Systems & Networking Technology (219.43) [X2(7,N=241) = 96.92, p = .000)].

Table 8 *Differences in the implementation of heutagogy, peeragogy and cybergogy approaches among vocational college instructors based on the program*

Item	Heutagogy	Peeragogy	Cybergogy
Kruskal-Wallis H	114.346	89.759	98.583
Df	8	8	8
Asymp. Sig.	.000	.000	.000

Table 9 presents the Kruskal-Wallis test used to determine if there is a significant difference between the practices of Heutagogy, Peeragogy, and Cybergogy among instructors in Vocational Colleges based on their teaching experience. A Non-Parametric test (Kruskal-Wallis) was conducted to examine significant differences among the four levels of teaching experience practiced in Vocational Colleges. The results of the Kruskal-Wallis H test show that there is a significant difference among the four teaching experience periods based on the minimum scores of Heutagogy, as follows: less than 3 years (124.37), 3-8 years (153.66), 9-15 years (81.26), and 16 years and above (115.07) [X2(3,N=241) = 26.031, p = .000)]. Similarly, for the minimum scores of Peeragogy, there is a significant difference among the four teaching experience periods: less than 3 years (122.69), 3-8 years (152.93), 9-15 years (97.12), and 16 years and above (107.84) [X2(3,N=241) = 18.536, p = .000)]. Furthermore, for the minimum scores of Cybergogy, there is a significant difference among the four teaching experience periods: less than 3 years (133.9), 3-8 years (143.55), 9-15 years (117.5), and 16 years and above (90.01) [X2(3,N=241) = 22.03, p = .000)].

Table 9 *Differences in implementation practices of heutagogy, peeragogy and cybergogy approaches among vocational college teachers based on teaching experience*

Item	Heutagogy	Peeragogy	Cybergogy
Kruskal-Wallis H	26.141	18.950	23.067
Df	3	3	3
Asymp. Sig.	.000	.000	.000

The research findings indicate that overall, the level of implementation of the Heutagogical approach among instructors in Vocational Colleges is high level as indicated using mean score. However, there are research findings showing the highest and lowest minimum values. Item B6, "I ask students to search for materials from the Internet," is the item with the highest minimum mean score. According to a study conducted by Lambri and Mahamood (2019), the knowledge and ability of lecturers to integrate technological developments, such as the use of multimedia and the internet, in the teaching and learning process (T&L) is crucial. This helps to improve the quality of teaching and provides a more interactive and relevant learning experience for students.

The research findings indicate that overall, the level of implementation of the Peeragogy approach among instructors in Vocational Colleges is high. However, there are research findings showing the highest and lowest minimum values. The item showing the highest minimum value is item C8: "I guide students to complete assigned tasks." According to the action research conducted by Basir et al. (2021), this method has been successful in enhancing students' mastery of aspects of knowledge, skills, and attitudes toward completed tasks. Furthermore, teaching is a process of disseminating knowledge through planning, management, delivery, guidance, and assessment (Ni & Hassan, 2023).

The research findings indicate that overall, the level of implementation of the Cybergogy approach among instructors in Vocational Colleges is moderate. However, there are research findings showing the lowest minimum value. Referring to the study results, the majority of respondents practice the Cybergogy approach at a moderate level, with the lowest minimum value being D14: "I encourage students to carry out ICT projects that require cooperation from the local community." According to a study conducted by Noordin et al. (2021), lecturers face challenges when implementing online learning due to unsatisfactory internet access in some college areas. Challenges include technological imbalances among students, the need for technology training for lecturers, and problems with limited interaction with students.

The analysis results indicate that there are differences in the practice of implementing Heutagogy, Peeragogy, and Cybergogy approaches among vocational college instructors based on the program and duration of teaching experience. However, there is no difference in the level of practice of implementing Heutagogy, Peeragogy, and Cybergogy approaches among vocational college instructors based on the Zone. There are significant differences in programs/fields where not all fields are able to successfully implement Heutagogy, Peeragogy, and Cybergogy approaches. According to the findings of the study conducted by Rahman et al. (2020), vocational college instructors, especially from the Electronics Technology program, who implement web-based teaching methods, are still at a low level.

4. Conclusion

In summary, this study has successfully achieved all the objectives set by the researcher. Let us delve into the key findings related to the implementation of three distinct pedagogical approaches:

(a) Heutagogy Approach: TVET instructors demonstrate commendable performance in implementing the Heutagogy approach. They create opportunities for students to engage in inquiry-based, problem-based, and project-based learning. These self-directed teaching skills equip students to thrive in the competitive job market.

(b) Peeragogy Approach: TVET instructors effectively transition from traditional teacher-centered methods to student-centered learning. The chalk-and-talk approach is increasingly rare in this century. Instead, teachers act as facilitators, fostering collaborative learning. Students engage with peers, leveraging the 4C elements: creative thinking, critical analysis, collaboration, and effective communication to complete group tasks.

(c) Cybergogy Approach: TVET instructors exhibit moderate performance in implementing the Cybergogy approach. However, several constraints—such as age, program/field, and teaching experience—impact its execution. To enhance effectiveness, providing ICT-related courses for TVET instructors is recommended.

Based on the analyzed data, we conclude that differences exist in the practice of implementing Heutagogy, Peeragogy, and Cybergogy approaches among Vocational College instructors based on program/field and teaching experience. However, no significant differences are observed based on Zone among the Vocational College. These insights are crucial for assessing the level of practice of these approaches in Vocational Colleges. Despite limitations, such as time constraints and financial obstacles—the study provides valuable information. Expanding the sample to include instructors from other Vocational Colleges (e.g., GIATMARA, Mara Higher Skills College, Industrial Training Institute, Community College, and Polytechnic) would enhance generalizability. As recommendations, TVET institution should provide E-learning skills training for academic staff, review E-learning hours per program or field, and encourage effective implementation of PAK21 by College Vocational administrators. By addressing these recommendations, Vocational Colleges can bridge gaps and empower instructors for the benefit of student learning.

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Conflict of Interest

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

Author Contribution

The authors confirm contribution to the paper as follows: ***study conception and design:*** *Mohamad Adham Mohamad Anuar, Lee Ming Foong;* ***data collection:*** *Mohamad Adham Mohamad Anuar;* ***analysis and interpretation of results:*** *Mohamad Adham Mohamad Anuar, Lee Ming Foong;* ***draft manuscript preparation:*** *Mohamad Adham Mohamad Anuar, Lee Ming Foong;* ***proofread and review manuscript:*** *Andika Bagus Nur Rahma Putra. All authors reviewed the results and approved the final version of the manuscript.*

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