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A conceptual model for achieving equitable learning in higher education based on HyFlex learning

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Abstract

HyFlex learning is a hybrid learning transformation where this term is new, but the modality has been applied during the COVID-19 Pandemic and is being prepared for future learning. However, the main problems and challenges related to student's needs, expectations, cognitive learning styles, and pedagogical equity. This must be the highest consideration in determining the content, strategy, and choice of the best HyFlex learning mode. The student preferences need to be applied face-to-face, online synchronous, or online asynchronous. Therefore, this study is critical to providing solutions to the problems. This study uses a theoretical approach to cognitive learning styles, HyFlex learning modes, and pedagogy equity. This study produces a conceptual model of the interaction of HyFlex learning with an equitable cognitive learning style. This study becomes the essential reference for further empirical studies to make a final model that will become a reference for institutions, lecturers, and learning designers to formulate policies, establish strategies/methods, and provide feedback in the development of systems, content, and adaptive learning processes in an effective HyFlex learning environment equitable today and in the future.

Keywords: HyFlex learning; Kirton's cognitive theory; Felder-Silverman learning styles; equitable learning

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1. Introduction

The COVID-19 pandemic has had a tremendous impact on learning in universities. This situation has led to the adoption of various learning modalities as alternatives to face-to-face classes, such as modular learning, online learning, and hybrid learning globally [1-5] . After the COVID-19 pandemic, most students will return to campus, so the multi-access learning offering, namely HyFlex learning, is important to consider and develop to implement sustainable digital learning according to future demands and needs [6,7]. HyFlex learning combines face-to-face, online synchronous, and online asynchronous delivery in a single course where students choose when and how students learn [8].

Preliminary studies conducted by the author on universities in Indonesia show that the main problem of online/hybrid/HyFlex learning lies in the choice of strategy/interaction mode, content that is not as needed because it does not meet the principles of learning style, and pedagogical justice. The hybrid mode is not yet by the need's preferences, which impacts the content, process, and learning outcomes. Therefore, the fundamental and very important thing from the idea of HyFlex learning today and in the future is that student's needs, expectations, learning styles, and pedagogical justice must be the main consideration. In particular, in determining the best learning strategies and styles to be applied in face-to-face and online classes. Literature studies confirm that the HyFlex learning environment allows students to choose a learning style according to their learning needs field [5]. The problem is the difficulty of identifying students' cognitive learning styles online [9], although cognitive learning style is an important element in selecting online learning methods [10,11]. In addition, pedagogical justice seeks equal opportunities for diverse students by providing various teaching and learning strategies and styles field [12]. This can be done by recognizing the strengths and weaknesses of each HyFlex mode [13,14]. Therefore, investigating the HyFlex learning mode based on cognitive learning styles is very important to realize a suitable choice of HyFlex mode and eliminate potential losses as much as possible when students choose one of the modes of HyFlex learning.

Literature review shows that the study of hybrid/HyFlex learning has attracted the attention and focus of researchers in several countries with different locations, research objects, and methods, including; student personalities using cognitive styles in an online environment [15], VAK learning style and hybrid learning [11], hyflex learning needs assessment for critical thinking [16], equity and student engagement in HyFlex learning [13], HyFlex adoption in higher education in response to COVID-19 [1], effective engagement strategy in hyflex modality with cognitive method [14], hyflex pedagogical challenges and opportunities[17].

1.1. Purpose of study

In particular, this literature review aims to produce a conceptual model of HyFlex learning that can realize equitable learning in higher education. This interaction model uses a cognitive learning style approach, HyFlex learning mode, and equity pedagogy. This study is expected to contribute to providing a basic reference for further empirical studies, to produce a final model that will become a reference for institutions, lecturers, and learning designers to formulate policies, establish strategies/methods and feedback in the development of systems, content, and adaptive learning processes in the environment HyFlex learning that is equitable today and in the future.

2. Materials and method

To achieve an appropriate HyFlex mode selection and minimize potential losses when students select a HyFlex learning mode, it is crucial to investigate the HyFlex learning mode based on cognitive learning styles.

3. Results

3.1. HyFlex Learning

HyFlex learning is a combination of hybrid learning and flexible learning. HyFlex learning is combined because learning content is offered in face-to-face and online modes [18]. Flexibility was introduced because it allowed students to attend face-to-face and online class sessions or do both fields [16]. HyFlex learning has four main principles, namely: (a) *learner choice*, allowing students to choose the mode of participation throughout the semester; (b) *equivalency*, which refers to providing similar activities for all students, (c) *reusability*, all activities and resources must be available to all students and (d) *accessibility*, providing resources and training [14]. Hyflex learning offers students weekly/topical options to attend class in one or all of three modes: (1) face-to-face, (2) online/virtual synchronous, and (3) online asynchronous (text/video, forum, assignments) [18]. With a good arrangement of these three hyflex learning modes, distance students will fully participate and get the same benefits as students who attend face-to-face in accessing learning materials and activities [19].

Despite these advantages of HyFlex learning, there are two main challenges. *First,* Students must have equal opportunities to study in both modes and should not be disadvantaged by choosing one method over the other. In particular, students must have equitable access and ways to learning resources and learning support according to their learning needs or cognitive style. *Second,* how student active learning strategies, such as feedback, classroom response systems, or collaborative activities, can be implemented in face-to-face delivery is often different from how these strategies can be applied in online delivery. Therefore, knowing the preferences of students' needs through a cognitive learning style approach in the HyFlex learning mode and how students' perceptions of the choice and application of this mode are very important to research to realize equitable learning today and, in the future, [20].

3.2. Kirton's Cognitive Styles

Cognitive style is the relationship between two dimensions, namely personality, and cognition. Cognitive style is usually described as a personality dimension that influences attitudes, values, and social interactions. It is also described as how information is obtained and processed [21]. There are various theories related to cognitive styles, such as Riding and Cheema's theories with wholist–analytical and Verbaliser-Imager elements [12]. Choi and Sardar's approach with field-dependent and field-independent elements [22] and Kirton's adaptation-innovation theory (KAI) with adapter and innovator elements [21]. However, in this study, researchers used Kirton's adaptation-innovation approach.

Kirton's adaptation-innovation theory was developed to explain trends in cognitive style, creative thinking, problem-solving, and decision-making [21]. According to Kirton, cognitive techniques are divided into adapters and innovators. An adapter is an individual who does things better or easily adapts to a system. At the same time, an innovator is an individual who likes to do things differently or is more innovative in using a system. Relevant to that, every student has differences in using the hyflex learning mode. The study's results confirm that the adapter affects the ease of use of the system so an easy-to-use system leads to higher system usage [21,23]. This means that the better the adapter and the innovator, the higher the preference and use of the hyflex learning mode for students. So, the use of this theory is

considered very suitable to see the characteristics of students' cognitive style in choosing the HyFlex learning mode.

3.3. Felder-Silverman Learning Styles

Learning styles are considered a subset of cognitive techniques generally classified as cognition-centered, personality-centered, or activity-centered fields [10]. Determining student learning styles can assist lecturers in determining HyFlex learning strategies and modes. Understanding student learning styles will help to see the strengths and weaknesses of students in learning; students tend to be able to adjust to the learning environment and learn knowledge easily. Previous research has been conducted research related to learning styles on different objects. Some are the Kolb Learning Style Model, Neil Fleming's VAK/VARK model, Felder-Silverman Learning Style Model, etc. [24,25].

In this study, the authors consider four dimensions of learning styles proposed by the Felder and Silverman Learning Styles Model (FSLSM): (1) input (*visual/verbal*), representing how students receive information; (2) perception (*sensory/intuitive*) related to student perception; (3) processing (*active/reflective*), representing how students process information; and (4) understanding (*sequential/global*) explaining the method of student understanding [10,25,26]. The use of this FSLSM learning style model with the consideration that this model is more comprehensive than other learning style models [10]. FSLSM categorizes student preferences on four dimensions with detailed descriptions of their characteristics. In addition, the authors consider that FSLSM provides the most suitable measurement to examine its interaction with the hyflex learning mode for learning equality.

3.4. Equity Pedagogy

Equity represents students' perceptions of equal learning opportunities field [27]. In this study, the equity in question is pedagogical equity which shows learning strategies/methods or learning styles using learning technologies such as HyFlex learning. Equity of pedagogy can also be referred to as using correct teaching strategies through digital learning media [12]. Awareness and understanding of cognitive learning style-based pedagogy are seen as the basis for equality in learning. HyFlex learning provides various communication possibilities for all students, offers easy access to teaching materials, increases equity during the teaching and learning process, gives students the freedom to study independently in the fashion they want, and improves quality by providing a technology-rich learning environment [28]. The hyflex learning mode offers a higher degree of flexibility for learning. Still, the challenge is ensuring online students are not disadvantaged regarding their interaction and knowledge acquisition opportunities in the field [13].

Usually, lecturers have significant self-awareness of how students learn well but little self-reflection about how students learn. This can cause equity in the learning process if the way students learn is projected into strategies and learning methods that are the same for all. Learning equity seeks to provide equal opportunities for diverse students by providing a variety of learning strategies and styles [12]. UNESCO's Education for All Framework emphasizes that all groups need equality in quality education and that education systems must consider the diversity of learning needs among students. Therefore, learning opportunities must be provided in various modes/ways to meet student learning needs by understanding the context of cognitive learning styles used by the HyFlex learning mode for digital learning equity in universities.

Based on the background description and theoretical review, the authors propose a conceptual model of HyFlex learning to realize equitable learning in Higher Education in Figure 1. The following HyFlex model uses a cognitive learning style approach from Kirton's theory and Felder Silverman's Learning Styles, which is linked to three HyFlex learning modalities: Face-to-face, online synchronous, and online asynchronous

to equity pedagogy theory. This model also adds moderation, namely gender, and department, which can be changed according to research needs.

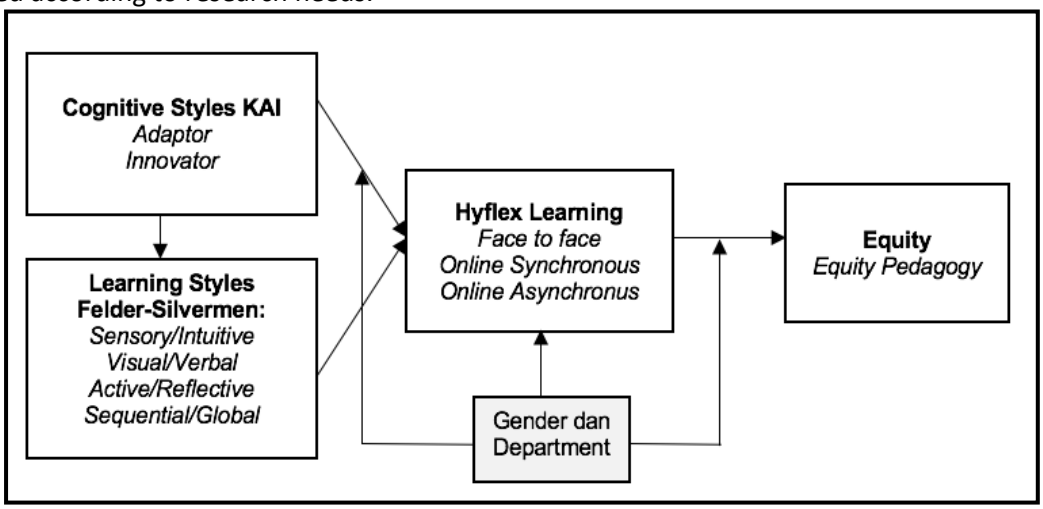

Fig 1. HyFlex learning conceptual model for equitable learning

4. Conclusions

The main problems and challenges faced for implementing HyFlex learning today and predicted in the future are related to the needs, expectations, cognitive learning styles, and pedagogical justice for students. This will be important in determining which HyFlex learning content, strategies, and modes are suitable for students' preferences to be applied in face-to-face, online synchronous, or online asynchronous. Therefore, this study is very important to provide solutions to the problems. This study uses a theoretical approach to cognitive learning styles, HyFlex learning mode, and pedagogy equity. This study produces a conceptual model of the interaction of HyFlex learning with an equitable cognitive learning style approach.

The author reviews the conceptual model presented in Figure 1 through field research to produce a final model by taking the research location in Indonesia. However, further studies can use and develop this model as a basic reference in empirical studies to produce a final model according to the study's context.

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