

# Students Diversity and the Implementation of Adaptive Learning and Assessment

## A Systematic Literature Review

Zulmi Ramdani<sup>1\*</sup>, Andi Amri<sup>2</sup>, Deni Hadiana<sup>3</sup>, Jaka Warsihna<sup>4</sup>,  
Zulfikri Anas<sup>5</sup>, Susi Susanti<sup>6</sup>

<sup>1</sup> Faculty of Psychology, UIN Sunan Gunung Djati Bandung

<sup>2</sup> Muhammadiyah University Prof. Dr. Hamka Jakarta

<sup>3</sup> Centre of Educational Assessment, Kemendikbudristek RI

<sup>4</sup> Open Universities

<sup>5</sup> Centre of Curriculum and Books, Kemendikbudristek RI

<sup>6</sup> Hasanuddin University

\*Corresponding author. Email: [zulmiramdani@uinsgd.ac.id](mailto:zulmiramdani@uinsgd.ac.id)

### ABSTRACT

Identification of the diversity of students is often an important point that teachers rarely consider before the learning is carried out. In fact, by understanding this diversity, teachers can undoubtedly carry out adaptive learning and assessments that are suitable for the conditions of students. This study aims to identify the importance of knowing the diversity of students and how teachers can implement appropriate learning and assessment. A systematic literature study was used in this study. Researchers collect and select various related sources through the existing search engine database. In-depth discussion schemes and continuous cognitive briefing were carried out to objectify the study results. The results showed that the diversity of students could be seen from the aspects of their readiness cognitively and non-cognitively, learning styles, interests, talents, and learning experiences. These aspects are essential for carrying out adaptive learning and assessment. Good learning is done by seeing the situation in children, which can be combined with learning resources in any form without exception. It is expected that, even in limited conditions, teachers can still carry out learning because they already understand the situation of their students and can take advantage of various things that exist in their environment as learning resources.

**Keywords:** Adaptive learning and assessment, learning process, students' diversity, systematic literature review

### 1. INTRODUCTION

Changes that occur continuously and the development of human life that is increasingly developing make individuals have the best scheme in adapting. Including in education, the development of technology that is growing for teachers must be well prepared to use it as part of their learning. Furthermore, many factors then also determine why a teacher must have a strategy in implementing adaptive learning [1-2].

Adaptive learning emerges as a strategic step that teachers can take following existing factors. Curriculum changes every period require teachers to adjust the curriculum. The difference in location is another challenge for teachers to carry out learning. Besides that, some studies agree that differences in students, teacher characteristics, school characteristics, and other differences require teachers to implement adaptive learning and assessment [3-5].

Adaptive learning and assessment is a learning scheme that teachers can do anywhere, anytime, and in any situation. Teachers can organize learning even in the most challenging conditions, such as amid disasters or the limitations of physical facilities and accessibility of learning. Adaptive learning and assessment are essential for a teacher in this digital era so that even if there is an unexpected situation (natural disaster), learning could still go [6-8].

The concept of adaptive learning and assessment is still rarely identified by most researchers today. Especially in practice, there are still many teachers trapped by existing rules and administrations when the most important thing is that learning can be done in any situation. Recent research has shown that learning and adaptive assessment are essential, but very few provide a definitive framework for implementing adaptive learning and assessment itself [9-10].

Researchers themselves assume that most existing concepts do not give teachers space to identify essential factors in adaptive learning assessment. In the various existing literature, the thing that teachers must consider when going to do adaptive learning is related to the religiousness of students. Diversity of students is a familiar concept, so it needs to be explicitly identified into a simple point. This study aims to unanalyzed the important elements that teachers must identify before conducting adaptive learning and assessment.

## 2. METHOD

The study conducted by these researchers uses a qualitative approach to systematic literature review models. Research models are conducted to provide theoretical information about the goals specified by the researcher. Systematic literature review refers to a type of research that collects, analyzes, and interprets theoretical information obtained from various existing scientific sources [11-12].

Researchers map the goals to be achieved to start a systematic literature review. Objectives goals related to adaptive learning and assessment models, as well as important aspects, were identified. The researchers determined the keywords used and related sources from the initial procedure. The keywords used include adaptive learning and assessment, student learning center education, and student diversity. From these keywords, researchers look for the source of related articles by using some often-used databases, such as Google Scholar, Chicago, Researchgate,

ScienceDirect, Sage Publications, and PubMed. From these search results, the most relevant articles will be obtained. The characteristics of the article to be selected are

- a. The article contains predefined keywords.
- b. Articles sourced from accredited national journals, reputable international journals, or other similar sources are valid.
- c. The article has been published for at least the last ten years.

The selected articles will then be selected first. Then the researcher identifies the existing abstract along with the existing content. Selected articles are then analyzed using thematic content analysis by identifying content related to articles that can be used as a source of information. The researcher conducts a follow-up discussion about the selected article to add objectivity to the article. Interpretation is tailored to the goals and needs of researchers in this study.

## 3. RESULT AND DISCUSSION

This study provides information while providing a strategic step for teachers in carrying out adaptive learning and assessment. In this section, researchers will explain first the basic concepts of adaptive learning and assessment that have been made based on the results of discussions and interpretations of existing articles. After that, the researcher presents the teacher's important aspects before conducting adaptive learning and assessment.

### 3.1. *Basic Principles of Adaptive Learning and Assessment*

Adaptive learning and assessment always include the teacher's way of finding effective and meaningful learning to optimize the development of students. According to [13-14], some basic principles that must be done in the concept of adaptive learning and assessment through (1) adapting learning and assessment in response to the religiousness of students so that they can be optimal in their learning; (2) is not individual learning but responds to the religiousness of students in a balanced manner either through guidance or self; and (3) the organization of flexible and proactive learning adapted to the religiousness of students. These three basic principles must then be considered before adaptive learning and assessment.

### 3.2. The Urgency of Adaptive Learning and Assessment

Adaptive learning and assessment conducted optimally, balanced, and continuously will result in more meaningful learning. This, of course, can be felt directly by students who experience it. Based on the results of the review of selected sources [13-15], some of the important benefits to be gained in this adaptive learning and assessment include; (1) increased self-satisfaction and self-efficacy; (2) facilitate students to become independent students; (3) increase the motivation and achievement of students; (4) align learning with the potential and needs of the student, and (5) facilitate all students can learn.

### 3.3. Analysis of Learning Factors and Adaptive Assessment

To get optimal adaptive learning and assessment, teachers must identify at least five important aspects before conducting adaptive learning and assessment [13-15]. These five aspects can be seen in figure 1.

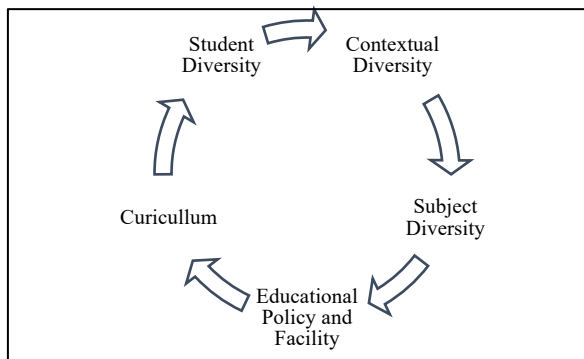


Figure 1. Factors that the teacher must analyze

Figure 1 explains five important factors teachers should consider before conducting adaptive learning and assessment. Students' diversity is related to various things that exist in students that will bring in learning. Contextual diversity is concerned with how the location or area around the learning site can be a source of learning. Subject diversity is concerned with the extent of the material to be studied. Educational policies and facilities are concerned with facilities and rules that support the learning process. The curriculum deals with the great framework of education as a global learning guide.

### 3.4. Understanding The Diversity Students as a Key

This study emphasizes that understanding the diversity of students is an absolute and uncertain learning scheme that will be carried out. Based on the existing literature results, students' diversity is always related to various individual elements that exist in students [14-15]. Aspects that must be considered include the readiness of cognitive and non-cognitive, the interests and talents of students, the learning style of students, and how the learning experience of students. These four components should be an important consideration for teachers to identify the diversity of students.

The study results presented in the previous description provide information that is quite clear to researchers. To carry out adaptive learning and assessment, teachers must first know about this concept's basic principles. Adapting learning and assessment by responding to students' diversity will help teachers find the advantages and weaknesses that students have so that interventions will be given they can be fair according to the situation of students. Although teachers are required to respond to the diversity of students, it does not mean that teachers do learning individually but rather optimize on things that are considered less in the community so that whatever process is carried out, the end goal is students have the same understanding and competence in a material. In addition, the existence of other basic principles is to make students proactive individuals where this condition allows them to optimize what they want. It becomes something that can be learned and optimized.

Some previous studies later agreed that this adaptive learning and assessment process provides a significant influence not only for the identity of students but for the sustainability of the learning process itself. When students can optimize their advantage, this will improve various psychological aspects that exist in them, including satisfaction, confidence, motivation, and self-efficacy. So, in the end, they are sure of what they are doing, which will impact their prestige. Another benefit is that with adaptive learning and assessment, all students can learn under the conditions they are experiencing so that there is no reason for a person to learn because of existing limitations.

It should be emphasized that by understanding the basic principles and benefits of adaptive learning and assessment, the next teacher is required to analyze

various factors before the learning is carried out. It starts from identifying the situation and readiness in the students to determine the most appropriate material that can be learned from the context of the student's environment until they are indeed able to learn in their best possible way.

However, it is not easy to implement when the teacher identifies these factors. It takes an optimal ability from the teacher itself, including pedagogical ability, media, and technology mastery, to the ability of literacy used. After it is done, the teacher will quickly identify the diversity of students. Understanding students is essential because the teacher will begin to determine the suitable scheme and the form of learning and assessment relevant to the student and the condition of the students.

This study provides a philosophical and practical understanding to present learning in a more adaptive scheme. With various discoveries added, researchers believe that the concept of learning and adaptive assessment can be a suitable model in explaining the various dynamics of education that occur. With this model, there is no longer a reason for a teacher not to do learning, and from this model can then be done more diverse learning replicates. This study is conducted at qualitative stages so that an objective process is needed to look further at the concept offered. Future research required better use of objectivization and generalization principles.

#### 4. CONCLUSION

This study shows that the diversity of students, including cognitive and non-cognitive aspects, readiness, interests and talents, learning styles, and their experiences, should be the case initial and significant attention for teachers before conducting adaptive learning and assessment. Whereas adaptive learning and assessment in this study confirm that taking into account the diversity of these students, teachers will be able to conduct learning and assessment. Adaptive is then adapted to context analysis, learning load analysis, academic unit analysis, and curriculum analysis.

#### AUTHORS' CONTRIBUTIONS

All the authors contributed significantly to the study. Zulmi Ramdani plays a role in formulating ideas and retrieving data. Andi Amri plays a role in data retrieval and screenwriting. Deni Hadiana acted as a drafter and wrote draft writing. Jaka Warsihna was

instrumental in retrieving data and writing scripts. Zulfikri Anas assists in language editing and translation. Susi Susanti was instrumental in reviewing the script and perfecting the final script.

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#### REFERENCES

- [1] Fatahi, S., An experimental study on an adaptive e-learning environment based on learner's personality and emotion, 2019.
- [2] Vandewaetere, M., Desmet, P., & Clarebout, G., The contribution of learner characteristics in the development of computer-based adaptive learning environments, *Computers in Human Behavior*, 2011, 27(1), pp. 118–130. DOI: <https://doi.org/10.1016/j.chb.2010.07.038>
- [3] Berger, E. R., Kreutzer, L., Halverson, A., Yang, A. D., Reinhart, S., Leary, K. J. O., Williams, M. V., Bilimoria, K. Y., & Johnson, J. K., Evaluation of Changes in Quality Improvement Knowledge Following a Formal Educational Curriculum Within a Statewide Learning Collaborative, *Journal of Surgical Education*, 2020, 77(6), pp. 1534–1541. DOI: <https://doi.org/10.1016/j.jsurg.2020.04.018>
- [4] Horng, J. S., Hsiao, H. L., Liu, C. H., Chou, S. F., & Chung, Y. C., Learning innovative entrepreneurship: Developing an influential curriculum for undergraduate hospitality students, *Journal of Hospitality, Leisure, Sport and Tourism Education*, (2020). 100289. DOI: <https://doi.org/10.1016/j.jhlste.2020.100289>
- [5] Krier, L., Library curriculum outside the classroom: Connecting library services to student learning, *Journal of Academic Librarianship*, 2021, 47(2), 102303. DOI: <https://doi.org/10.1016/j.acalib.2020.102303>
- [6] Meimulyani, & Cartoyo, Adaptive learning media for children with special needs, PT Luxima Metro Media, 2013.
- [7] Khasanah, I., Prasetyo, A., & Rakhmawati, E.,

- Traditional games as a medium of stimulation aspects of early childhood development, *PAUDIA Research Journal*, 2011, 1(1), pp. 59–74.
- [8] Sulasmono, B. S., & Dwikurnaningsih, Y., Development of Adaptive, Cooperative, Active and Reflective (Expert) Learning Models, *Satya Widya*, 2012, 28(1), pp. 93. DOI: <https://doi.org/10.24246/j.sw.2012.v28.i1.p93-110>
- [9] Bottery, M., Education and globalization: Redefining the role of the educational professional, *Educational Review*, 2014, 58(1), pp. 95–113. DOI: <https://doi.org/10.1080/00131910500352804>
- [10] Chiu, M. H., & Duit, R., Globalization: Science education from an international perspective, *Journal of Research in Science Teaching*, 2011, 48(6), pp. 553–566. DOI: <https://doi.org/10.1002/tea.20427>
- [11] Amrullah, S., Tae, L. F., Irawan, F. I., Ramdani, Z., & Prakoso, B. H., Systematic study of aspects of creativity in educational contexts, *Psympathic: Journal of Scientific Psychology*, 2018, 5(2), pp. 187–200. DOI: <https://doi.org/10.15575/psy.v5i2.3533>
- [12] Laar, E. van, Deursen, A. J. A. M. van, Dijk, J. A. G. M. van, & Haan, J. de., Computers in Human Behavior The relation between 21st-century skills and digital skills: A systematic literature review, 2017, 72. DOI: <https://doi.org/10.1016/j.chb.2017.03.010>
- [13] Ralph W. Tyler, *Basic principles of curriculum and instruction*, University of Chicago Press, 2013.
- [14] *Knowing and responding to students – A differentiated instruction educator’s guide*, 2016.
- [15] Carol Ann Tomlinson, *The differentiated classroom: Responding to the needs of all students*, 2014.