



The Effectiveness of Differentiated Instruction, Implementation in Indonesia Higher Education: A Literature Review

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Abstract. When discussing upon the instructions available to be utilized in the education setting, there are different variations available. Fundamentally we understand instruction as the process of teaching and of the engagement by utilizing the learning content. This connects upon curriculum that are organized and engaging in means to implement the learning content. With the usage of this method, it has been found upon the failure to give varied teaching instruction that are considered suitable upon mixed ability classroom because the instructions do not match upon the student's proficiency level. It has been inquired that Differentiated Instruction offer upon aspects like culturally inclusive education environment as well as differentiation and modification of curriculum. In regard to this, it is expected that school environment that utilizes this method of instruction to gain effectiveness in the learning process. The objective of this study revolves around gaining accurate, concrete as well as factual in regard to the research problem: Does applying differentiated instruction in the higher education setting create upon effective learning structure in Indonesia higher education? This paper utilizes the method of systematic literature review upon gaining factual knowledge as well as factual information regarding the implementation effectivity, a total of 20 articles were reviewed. Results of this paper indicates that Differentiated Instruction Implementation in Indonesia Higher Education shows effective indications as well as the conclusion infer upon the effectiveness of the Differentiated Instruction method. Through this research it is expected to give upon further information that can be utilized for further research regarding the implementation of Differentiated Instruction in Indonesia Higher Education.

Keywords: Differentiated instruction · higher education · effectiveness · Indonesia · literature review

1 Introduction

Conventional teaching strategies have been implemented for a long period of time. It is sought out to be the most relevant teaching method teachers have been giving to fellow students. Butler, M. and Van Lowe, K reports that the existence of conventional traditional methods of teaching (that revolves mainly upon teacher-based learning) to

be outdated and in some instances to be ineffective due to the limited ability of teaching instructors in engaging with the students. Existent problems include inability to connect upon the various diverse backgrounds of students [1].

Differentiated learning can be understood as the learning process that accommodates upon the student's learning need. This approach is considered upon being able to make individual differences on the basis for learning planning. We know that Differentiated Instruction (DI) differentiates upon the instruction based in accordance to each individual. This is when teachers facilitate student according to their needs, because each student has different characteristics, so they cannot be given the same treatment. In this approach, the individual differences of students are used as students' strengths to help facilitate understanding in learning. Differentiated Instruction is applied through a varied method which are differentiation by content, differentiation by process and differentiation by product.

The study of the use differentiated instruction reports that the overall student performance increased as well as more engaging interaction between students in learning [2]. It also stated that students feel comfortable working with each other in groups, participate actively and stay focused, and are comfortable asking questions. Other study reported that throughout the deliverance of Differentiated Instruction it meets upon the needs of each student, maximizing the quality of student learning, increasing student motivation, making students more involved and focused in class [3]. Due to research abroad claiming that the implementation and usage of Differentiated Instruction in the classroom being effective in various ways, this encourages and builds upon the purpose of creating this paper. A total of 25 journals has been compiled that fits upon the target criteria to examine and analyze upon the effectiveness of the implementation of Differentiation Learning in Indonesia Higher Education.

2 Methods

Study Design

The design of this research is considered literature review. Literature review can be understood as research that examines or critically reviews knowledge, ideas, or findings contained in the body of literature through the process of literature review. It is also a systematic and explicit method for identifying, evaluating and synthesizing research results of the intended paper. The nature of this research is descriptive analysis, which is a regular breakdown of the data that has been obtained, then an understanding and explanation is given so that it can be understood well by the reader. A pre-defined criteria will be established to keep track of the articles that will be included and excluded from this paper.

In this paper a table will be created in means to present the informative data derived from a total of 20 articles regarding the title to gain information of the effectiveness of differentiated instruction implementation in Indonesia Higher Education.

Search Strategy

The search strategy process for the publication articles and E- Journals articles was done through the exploration of the following sites: Google, Google Scholar, and Research Gate using selected keywords related to this paper's title that are Differentiated Instruction in Indonesia (Table 1).

Table 1. Database Source for Searching Relevant Literature

Search Engine	Search Domain
Google	https://www.google.co.id
Google Scholar	https://scholar.google.co.id
Research Gate	https://www.researchgate.net
CORE	https://core.ac.uk/

Articles and journals that are considered to have met the pre-designed inclusion and exclusion criteria are taken for further analysis. This Literature Review uses literature published in 2013–2021 which can be accessed in full text in pdf. The criteria for the journals reviewed are research journal articles in Indonesian and English with the title and subject of the articles being related to Differentiated Instruction Implementation in Indonesia Higher Education (Table 2).

Journals that match the inclusion criteria and have a theme of the relationship in regards with the reports of Effectivity of Differentiated Instruction Implementation Indonesia Higher Education are then reviewed. The journal criteria selected for the review are journals in which there is a theme of the effectiveness of differentiated instruction. The research inclusion criteria can be seen in Table 3.

Using the criteria of inclusion and exclusion, from 40 articles, we come up with 20 articles, as can be seen in Fig. 1.

Synthesis of Data

Table 2. Search Strategy on Database

Steps on finding and searching for the articles from the database
1. Search Relevant articles related to Differentiated Instruction in Indonesia
2. Search Relevant articles related to: Higher Education Setting
3. Includes the keyword of differentiated instruction, effectivity, higher education, Indonesia

Table 3. Database Source for Searching Relevant Literature

Criteria	Inclusion
Subject	Higher Education
Language	Bahasa Indonesia and English
Journal Article Type	Full Article, Full Text PDF and Research Article
Journal Article Theme	Reports upon the effectivity or ineffective of the Differentiation Method in the Learning Structure

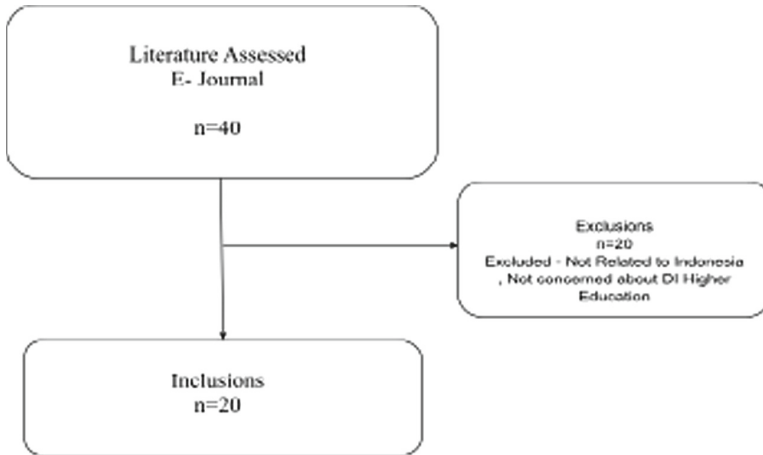


Fig. 1. Summary of Search Process and Review Process

This literature has been synthesized through the usage of narrative method, by grouping upon various similar extraction data in accordance with measured results in correlation to the results to answer the objective of this research article. Research journals and articles that are considered to have matched the inclusion criteria set upon the objective were collected and systematically organized through a spreadsheet that includes upon the following important aspects, that are the name of the researcher, the year of publication of the journal, the title of the study, the method and a summary of the results or findings. The summary of the research journal is entered into the table according to the format.

To be able to clarify further, the abstract as well as the full text of journal article were thoroughly read and observed. Those summaries obtained are then analyzed through the contents regarding the contains of the research objective and research results/findings. Analysis of the content of journals are then coded and carried out on the contents of the journal being reviewed based on the outline or essence of the research which was carried out by parsing in a sentence. Then, if it had been collected then the similarities and differences in each study were then discussed to draw conclusions.

3 Results and Discussions

The articles that were included and used for this systematic literature review can be seen in Tables 4 and 5.

The themes that were shared the most is “increase in learning achievement” and the themes that were shared least are “interaction in learning process”, and “active participation”. Figure 2 provides a clear picture of shared themes.

Through the results obtained from the literature review of a total of 20 journal articles regarding the effectiveness of Differentiated Instruction Implementation in Higher Education, specifically in Indonesia. Results presents upon a major finding that it is considered as an effective learning teaching method based on the 8 main themes that are

Table 4. Research Article Regarding Effectiveness of Differentiated Instruction Implementation

No	Articles	Findings
1	Application of Differentiation Learning Using the Blended Learning's Station Rotation Method to Improve Student Learning Outcomes in the Material of Hydrostatic Pressure [4]	With the usage of Pre-Testing and the method of Learning's Station Rotation about Hydrostatic. Results from this study stated there is an increase in student learning outcomes between before and after the application of the Blended Learning's Station Rotation learning method on hydrostatic pressure study material. This shows the N-Gain value of 0.54, which is included in the medium category.
2	Implementation of Differentiated Learning in an Effort to Increase Activities and Learning Outcomes of Mathematics for Class XI MIPA Students of SMA Negeri 8 Barabai [5]	The paper indicated an increase in learning activity as well as the implementation of Differentiated Instruction led a higher average learning activity also it shows that the application of differentiated learning can increase the activity and learning outcomes of mathematics students in class XI.
3	Application of the Worksheet-Assisted Progressive Differentiation Learning Method to Increase the Activity and Mathematics Learning Achievement of Class X MIPA 3 SMA Taman Rama Denpasar, Academic Year 2019/2020 [6]	Through the application of progressive differentiation learning methods assisted with LKS in mathematics it is deemed to have increased the activeness and learning achievement of High School Students.
4	Implementation of Differentiation Methods in Reflection on Islamic Religious Education Learning [7]	Qualitative and quantitative analysis shows that students responded positively to differentiated instruction (DI). It is sought out that differentiated instruction (DI) can support different needs and they plan to implement differentiated instruction (DI) in their future studies.
5	The Effectiveness of the Differentiated Instruction Approach in the Learning Process [8]	Differentiation in learning greatly affects the quality of students in lessons at university classes, one of which is the subject of Islamic Religious Education et al.-Islamic Elementary School Jabr. The enthusiasm of students is very visible when taking lessons. It is evident as they are proactive, each student has his own style in writing where they process and take note of materials given by the instructor in their individualized style.

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Table 4. (continued)

No	Articles	Findings
6	Application of Differentiation Learning in Improving Students' Mathematical Problem Solving Ability in Online Learning [9]	Description of Pre-Test and Post-Test results of the classes indicated upon the implementation of Differentiation in the class resulted upon a higher ability of problem-solving skills in the area of mathematics.
7	Application of Differentiated Instruction on Students' Creative Thinking Ability [10]	Differentiated instruction helps in student's comprehension of the learning materials, according to the analysis and observation held the Differentiated Instruction utilized is considered to be (Student Centered) that dominates upon the learning activities by the student. From the questionnaire given students were reported to have high satisfaction upon the learning process. The implementation of Differentiation helps students in being able to be opinionated and are not afraid to channel in their thoughts and inquiries. Other positive results are that they are able to work in groups (teamwork) enthusiastic in presenting the product of their learning activity. Differentiated Instruction indicated improvement in completeness of learning outcomes, especially in the learning ability and students' creative thinking skills.
8	Developing Students' Mathematical Connection Ability Through a Differentiated Instruction Approach [11]	Students were grouped into groups; through the implementation of differentiated instruction, it has been reported of the improvement in the student's mathematical connection ability compared to the conventional learning. Students are more interested because it is deemed to effectively facilitate students to make connections in the discussion.

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Table 4. (continued)

No	Articles	Findings
9	Differentiated Instruction In Accommodating Individual Differences Of EFL Students [12]	Differentiated Instruction enables one to be able to perform successfully in the English Language subject. As indicated from the research, successful indicators are reached as students that go through differentiated instruction methods are generally more relaxed and confident to learn English based on their learning needs and preferences. Through this research it was also found that students demonstrated theoretical and practical advances of differentiated instruction, and students were accommodated upon their needs and differences.
10	The Effectiveness of Using Differentiated Instruction-Based Modules to Improve Students' Understanding of Mathematical Concepts [13]	This study incorporates pre-test and post-test assessments of understanding, overall students' conceptual understanding skills before and after learning with the use of differentiated instruction-based learning modules has increased.
11	Differentiated Instruction Across EFL Classrooms: A Conceptual Review [14]	Differentiated instruction gives benefits upon the process of shaping individual's core understanding, enhancing learning experiences as well shaping their attitude and perception upon the learning process and achievement in the future. Opportunities and results indicated that various opportunities could be gained through the implementation of differentiated instruction as it also pushes instructors to try and experiment upon the different possible strategies, method, and media in means of gaining improvement of student's achievement.

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Table 4. (continued)

No	Articles	Findings
12	Differentiated Instruction In Multicultural Classroom Of Primary Years Programme In Gandhi Memorial Intercontinental School – Bali [15]	With well-constructed design of the Instruction for students it was determined through the result of questionnaire administered as well as open ended questions that teachers give a majority of positive opinion regarding the practice of Differentiated Instruction as it was collectively defined that the practice of is believed to be interesting for students by the process of conducting sense-making activity and by practicing differentiated instruction can help teachers to operate the classroom in an effective matter. Through the questionnaire it was inferred that students show higher comprehensive knowledge in regards to the concept, implementation, and implication of differentiated instruction in the process of answering open-ended questions. Differentiated instruction also positively affects students' readiness, interest, and learning profile.
13	The Effect of Inquiry Learning Model on Mathematical Problem Solving Ability in Quadrilateral Material in Grade VII MTS Negeri 1 Medan in Academic Year 2016/2017 [16]	With the expository method of differentiation instruction, it has resulted in a higher increase of the average academic achievement of the student. Other than that, the differentiation method influences student's problem-solving skills.
14	The Effectiveness of Differentiated Learning Strategies to Increase the Learning Concentration of Children with Learning Difficulties [17]	Differentiated learning strategies design variations of learning that is considered to be interesting by combining types of children's learning styles in learning topics so that children are focused and interested in learning, from overall data analysis, analysis of data under conditions and analysis of data between conditions shows that there is an increasing concentration of learning in children with learning difficulties. From the results of the acquisition data, the differentiation learning strategy has an effect so that it can improve the learning concentration of children with learning difficulties

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Table 4. (continued)

No	Articles	Findings
15	The Effect of Differentiated Instruction and Achievement Motivation on Student's Writing Competency [18]	Differentiated Instruction showed effects upon the writing competency between the students where with the implementation of differentiation in the learning material and differentiation in the instruction there is a high connection of having high achievement motivation on the student's writing competency
16	Application of the Differentiated Instruction Approach in Improving High School Students' Mathematical Reasoning Ability [19]	Differentiated Instruction accommodates each student in accordance to their level of ability thus it gives motivation towards high school to be more enthusiastic in exhibiting their maximum performance in their learning process as the learning materials are also deemed easier to be understood.
17	The effect of the use of Differentiated Instruction-Based Module on students' learning motivation [20]	The implementation of differentiated instruction-based learning modules showed the results of having a very strong influence toward students' mathematics learning motivation.
18	The Impact of Differentiated Instruction on Students' Performance in Critical Reading [21]	Differentiated Instruction is deemed to be an effective and positively respond method of conveying viable learning materials in a customized manner for students. Examination also exhibits that student show upon active and more engaged learning activities and learning connection as exhibited through examinations held students were adjust upon their abilities and necessities that resulted upon a higher chance of attaining success in their academic records and academic abilities.

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Table 4. (continued)

No	Articles	Findings
19	Application of Differentiated Instruction Approach to Develop Students' Mathematical Problem Solving Ability [22]	Differentiated Instruction is considered to be an effective and a good method to be implemented to students due to the development of students' mathematical problem-solving abilities. Before being given treatment students' mathematical problem-solving ability is still relatively low, but after being given the different treatment mathematical problem-solving ability experienced development into the good category.
20	Experimentation of Mathematical Learning Using Mobile Learning with a Differentiated Instruction Approach [23]	Differentiated Instruction is considered to be more effective in comparison to mobile learning and direct learning as it promotes higher Creative Critical Thinking Processes in students.

going to be discussed. To further understand Differentiated Instruction, it is best that we gain fundamental understanding upon the practices of Differentiated Instruction. Differentiated Instruction generally is implemented with a basic structure to be able and to be accessible to facilitate upon individuals (student's) with diverse background and abilities. Differentiated instruction can be positively utilized in curating and enhancing student's higher - level ability thinking skills in order to not merely focusing on their memorization skills of the learning content delivered through the learning instructor.

The application and implementation of Differentiated comes in various methods which are Differentiating the Learning Content, Differentiating the Learning Process and Differentiating the Learning Product. Differentiating Learning Content relates to the application of differentiation of learning content and learning materials delivered through the teachers by not giving repetitive generic lectures to students. The differentiation of learning content could be done through providing upon more relatable and suitable resourceful learning materials in relation to the student's ability, this characterized through the students' ability in accordance to their level of comprehension, learning preferences as well as the learning profile of the student. Differentiating in the learning process is considered through the process of grouping individuals in accordance to their readiness in learning, learning profile as well as their preferences in the process of teaching and learning given. Through this, individuals can benefit upon trying different learning activities and upheld interactions with others within the relatable range of understanding and comprehension of the learning materials given where they can help and be motivated in achieving the similar learning goal within the group. Lastly, differentiation through the process. This is understood when teachers could foster as well as encourage student in demonstrating different skills through assessment that are

Table 5. Results of Literature Review

Theme/Findings		Article Title	Frequencies
1.	Increase in learning activities (Shape & Enhance Learning Experience)	2, 11, 14	3
2.	High Increase in Learning Achievement and Academic Performance (Conceptual and Academical)	1, 2, 5, 6, 8, 9, 10	7
3.	Higher Completeness of Learning Outcome (Competency)	4, 5, 15	3
4.	Increase in Student's Quality of Academic Process (Enthusiasm, Motivation, Learning Readiness)	5, 10, 11, 15, 17	5
5.	Increase in Understanding of Theoretical Learning Material	5, 6, 7	3
6.	Higher Achievement of Student's Creative Critical Thinking Processes	8, 10, 13, 15, 20	5
7.	Higher Interaction in Learning Process	3, 18	2
8.	Higher Active Participation during Learning Process and On-going Engagement	8, 11	2

sculptured in different learning activities not only the same assessment of paper and pencil [24].

After conducting the literature review of the journals, there are 8 main aspects of findings that are highlighted upon the effectiveness of the Differentiated Instruction Implementation in Indonesia Higher Education. The aspects will be discussed in detail. Firstly, we are going to discuss about high increase in learning achievement and academic performance that includes conceptual and academic. Articles that point upon this finding covers cognitive processing-based subjects like Mathematics as well as Physics. Through the analysis of the paper, it has been discovered that it mainly utilizes upon the form of Differentiating the Learning Process and Differentiating the Learning Content. Learning technique like Blended Learning's station rotation was adapted upon the learning design, student- led group designed discussion (grouped upon respective abilities learning style and learning profile). Other than that, instructors also benefits upon creating differentiation of the learning material used in the learning process with the usage of tiered task, availability of varied comprehension modules, where students are fitted an assigned upon suitable and corresponding designed learning materials and learning process at different levels in regard of their own complex understanding of comprehension [4].

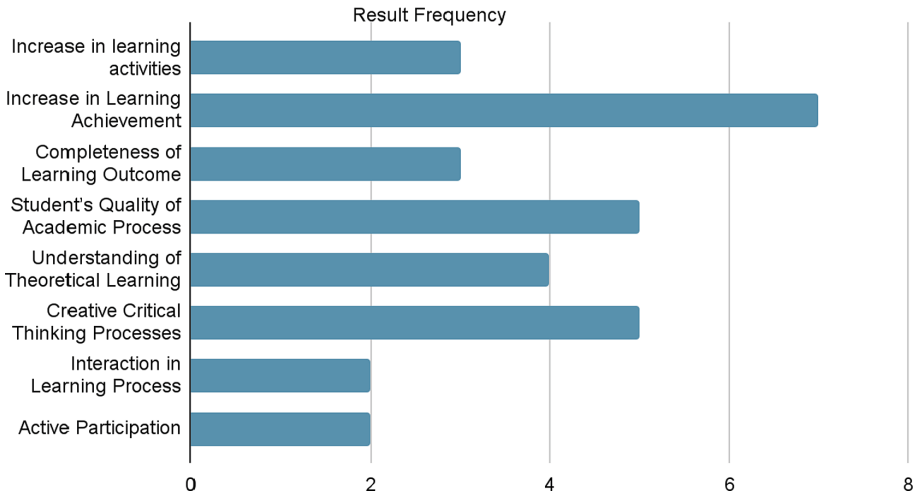


Fig. 2. Frequency Finding of Literature Review

After the differentiation occurred in the learning environment, it was measured upon how effective the implementation of the learning structures was through a series of test (pre-test and post - test). This theme goes in line with other findings found through the literature review of Increase in Understanding of Theoretical Learning Material, Higher Interaction in Learning Process and Increase in Learning Activities. With the knowledge that students are encouraged to be grouped according to their knowledge comprehension level this will lead to an engaging process of peers in the classroom to achieve sufficient grades on the subject, through the analysis of the paper it has also reported upon a heightened improvement in the area of learning activities in students in cases where they show higher interaction upon their peers and instructor. The method of Experimental where there are two groups which are controlled group (differentiated instruction implementation) and non-controlled group (conventional learning method) where correlation was measured through pretest and posttest with utilizing the strategy of grouping students with the customized learning material suitable to their ability known as the cooperative learning method [21].

These articles relates to the theme of Higher Completeness of Learning Outcome (Competency), where students focus on the following topics of “quick on the draw (learning material regarding surface area of the cube and beams and heterogeneous grouping), tiered tasks (for prism surface area learning material with the utilization of grouping students’ based on their level of learning readiness and learning profile) and tic tac toe (learning material regarding the surface area of the pyramid with grouping students on the base of their interest), Differentiated Instruction was utilized on the basis of Differentiation in the Process (grouping based on learning pace, peer reviewed learning) and Differentiation in Learning Material (using the variations of learning materials audio, kinesthetic, and visual, PowerPoint presentation it was reported to have shown engaging student’s learning experience and shaping for a more curated and unique learning experience that fit most to their ability. Relating to the dynamics of the learning structure it

has been figured out that students exhibit upon high completeness of learning outcome (competency) as students were able to understand and use between mathematical concepts and mathematical topics, capable of looking and efficiently find relationship of the problems given by the instructor in the assessment given and accomplishing the search for various relationships representation of mathematical concepts and procedures [5].

Moving to the literature area, subjects that cover through three- EFL (English Language) the research shown significant Higher Achievement of Student's Creative Critical Thinking Processes, students were given the ability to choose upon their desired task considered to be tiered task on the basis of their learning preference, learning profile and learning abilities, students were observed and to have shown working efficiently in different forms of working construct no partners, with partners, in groups, or with the help of the teacher, differentiated instruction implemented in teaching vocabulary in mixed ability classes with a focus on multiple intelligences and learning styles [18]. During the observation processes students exhibit their fondness and enjoyment to have the ability to pick upon learning options available like playing games in relation to word concentration or testing the spelling of their partners, due to the ability to have chosen their preferred task it gives upon independence towards students in their journey of learning the English Language, assessments administered by teachers were held differently where students were graded on how comprehensive and creative they are in the writing process by utilization of vocabularies. Through this English teacher were able to deliver the differentiation in content, process, and product in means to accommodate students' learning needs, styles and preferences.

When understanding about the dimensions that surround the effectiveness of learning processes of students it is in regards to these bases which are knowledge, understanding, application, analysis, synthesis and evaluation. Knowledge aspects are evaluated through the capability of students' in remembering and recalling learning materials which have been shown through the students have shown through the average score obtained of student (KKM) as well as higher indicator of knowledge understanding after the Implementation of Differentiated Instruction through the Post-Test. Other than that, the effectiveness is highlighted through application and analysis, in some cases students were given tiered task that promotes creative and critical thinking skills also related to HOTS (Higher Order Thinking skills with the utilization of differentiation is learning materials and learning process students benefit in understanding at higher level due to it being adjusted to their preference. Like discussed above, learners are also encouraged to apply the knowledge that they have gained in the classroom through a series of quizzes and learning activities at the tiered level. Lastly Synthesis and Evaluation in the findings of this paper students have also shown and demonstrated creative thinking processes in the area of cognitive for mathematical equations and literature creative writing they are pushed to be able to compile ideas derived through the learning process and generate new ones (construct).

4 Conclusion

Differentiated Instruction Implementation in Indonesia Higher Education Setting is actively associated with high effectiveness due to the positive themes and findings from this paper. For instance, students reported upon gaining higher conceptual understanding

towards the learning materials given by the instructor through a series of tests (pre - test and post-test). Other than the commonly known aspect of gaining academic achievement, there are also aspects that measures importantly that being the quality of learning process that includes enthusiasm, motivation and learning readiness. Due to differentiated learning being focused more on student - led learning instead of teacher - led learning individuals carry out more learning activities, interaction, and socialization with each other that evidently boost up the enthusiasm and motivation due to the learning structure of not being monotone and static. With differentiating the learning content, learners with low self - esteem and are not confident to ask in the classroom can discuss and engage in teamwork with individuals in the similar ability to solve problems and understand mathematical problems and planning out solutions, due to the given circumstance of differentiated instruction of flexible grouping, tiered instruction, and tiered assignments.

To sum up this literature review concludes upon the finding that differentiated instruction has shown positive effect on student's academic achievement, more active student participation and learning activities, completeness of learning outcomes and higher quality of learning process. There are also difficulties and problems associated to the implementation of differentiated instruction such as other factors that affect upon the process of Differentiated Instruction that could alter the efficiency level of the learning process, that is the complexity to curate and design appropriate learning materials adjusted for students with different learning abilities. Instructors find it to be challenging due to the number of variations needed to be provided. Other than that, the learning process administered to students with the method of grouping seems to have a downside where students can cause problems during group taught learning in which teacher still need to overtly supervise students which may lead to complications in the learning process.

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