Implement Differentiated Mathematical Education System in Teaching Mathematics for Students at Public Authority for Applied Education and Training- High Institute of Energy-Kuwait

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Abstract:

Differentiated instruction is becoming increasingly crucial in primary education since pupils of the same age differ in their demand for instruction and support while learning. Differentiated education entails tailoring instruction to the requirements of pupils. Differentiated education is thought to increase student achievement, however this is not proven. The aim of this study was to determine to what extent differentiated instruction has effect on student mathematics achievement in High Institute of Energy-Kuwait. The techniques used in applying differentiated instruction in mathematics teaching processes in such institutes are discussed here. A questionnaire to measure the range and effects of applying such method in math education is constructed here. The factors or latents contributing in using or constructing differentiated education mathematical system (DEMS) are divided into seven divisions: flexible-pace learning (FPL), collaborative learning (CL), progressive tasks (PT), digital resources (DR), verbal support (VS), variable outcomes (VO) and ongoing assessment (OA). Such factors contribution in implementing DEMS is measured by calculating implementation index (II). The results showed that II for such factors are 79.33% for FPL, 80.00% for CL, 77.50% for PT, 84.00% for DR, 82.00% for VS, 80.66% for VO, and 84.00% for OA. The total implementation index for all factors is found to be 81.70% which indicated excellent interpretation.

Keywords: Differentiated instruction, mathematics, teaching, implementation index, exams.

Arabic Abstract

أصبح التعليم المتنوع مهمًا بشكل متزايد في التعليم الابتدائي لأن التلاميذ من نفس العمر يختلفون في طلبهم للتعليم والدعم أثناء التعلم. يستلزم التعليم المتمايز تصميم التعليمات وفقًا لمتطلبات التلاميذ. يُعتقد أن التعليم المتمايز يزيد من تحصيل الطلاب ، ولكن لم يتم إثبات ذلك. كان الهدف من هذه الدراسة هو تحديد مدى تأثير التدريس المتمايز على تحصيل الطلاب في الرياضيات في المعهد العالي للطاقة - الكويت. نناقش هنا التقنيات المستخدمة في تطبيق التعليم المتمايز في عمليات تدريس الرياضيات في مثل هذه المعاهد. تم هنا إنشاء استبيان لقياس مدى وتأثيرات تطبيق مثل هذه الطريقة في تعليم الرياضيات. تنقسم العوامل أو العناصر الكامنة المساهمة في استخدام أو بناء نظام رياضي تعليمي متمايز (DEMS) إلى سبعة أقسام: التعلم المرن (FPL) ، التعلم التعاوني (CL) ، المهام التقدمية (PT) ، الموارد الرقمية (DR) ، الدعم اللفظي (VS) والنتائج المتغيرة (VO) والتقييم المستمر (OA). يتم قياس مساهمة هذه العوامل في تنفيذ DEMS من خلال حساب مؤشر التنفيذ (II). أظهرت النتائج أن II لمثل هذه العوامل هي ٧٩.٣٣٪ لـ FPL و ٨٠.٠٠٪ لـ CL و ٧٧.٥٠٪ لـ PT و ٨٤.٠٠٪ لـ DR و ٨٢.٠٠٪ لـ VS و ٨٠.٦٦٪ لـ VO و ٨٤.٠٠٪ لـ OA. وجد أن مؤشر التنفيذ الكلي لجميع العوامل هو ٨١.٧٠٪ مما يشير إلى تفسير ممتاز.

Introduction

Differentiated instruction is a hot issue in any education stage. It entails tailoring training to the needs and skills of pupils. Many elementary school instructors have trouble giving differentiated teaching (Houtveen & Van de Grift, 2001; McTighe & Brown, 2005). The majority just gave the same teaching to all kids (Houtveen & Van de Grift, 2001). Some teachers believe in this method of instruction because it ensures that each student is treated equally. However, utilizing the same teaching for all children is likely to fall short for many pupils since the learning topic is outside of their zones of proximal development (Goodnough, 2010). Students of the same age differ in their demand for teaching and help during studying (Kanevsky, 2011; Landrum and McDuffie, 2010). As a result, instructors in elementary school must be aware of their pupils'

individual requirements and incorporate them into their instruction (Mulder, 2014).

- Differentiated instruction as promising approach

Differentiated instruction is based on the premise that because any group of students varies, teachers should expect student variety and alter their instruction appropriately (Smit & Humpert, 2012). Students arrive at school with a variety of experiences, abilities, and knowledge; consequently, teachers must arrange learning experiences that build on where they are (Kanevsky, 2011). Differentiated instruction, according to Dee (2010) and Roy et al. (2013), is a viable strategy to enhancing education. Differentiated education, they believe, is the key to academic achievement for all kids in normal classes. Differentiated teaching has numerous definitions. Differentiated instruction is defined by Roy et al. (2013) as "a strategy in which teaching is diversified and customized to meet the skills of students utilizing systematic techniques for academic progress monitoring and data-based decision-making." Differentiated education, according to Smit and Humpert (2012), is "a technique that enables instructors to prepare strategically to suit the requirements of every student." Differentiated instruction, according to Ruys et al. (2013), is "a collection of tactics that will enable teachers meet each student where they are when they join class and advance them ahead as far as feasible on their educational journey". Differentiated instruction is defined by Tobin and Tippett (2012) as "an approach to teaching and planning that may accommodate the requirements of varied learners in an inclusive classroom." Although there are some differences between these definitions, they all seem to agree that the goal of differentiated instruction is to meet the needs of students in order to support their learning process so that all individual students in the classroom can develop their own individual capabilities to the greatest extent possible. Differentiated education necessitates that teachers construct

lessons and units with different student characteristics in mind (Goddard et al., 2010). This implies that differentiated education is not a single strategy, but rather a method of instruction that combines several techniques (Hayes & Deyhle, 2001; Watts-Taffe et al., 2012). Working with kids in small groups and giving alternative learning content are examples of such tactics. Individualized instruction is not the same as differentiated instruction (Roy et al., 2013). Individualized instruction typically focuses on interventions aimed at resolving students' learning difficulties (Landrum & McDuffie, 2010), whereas differentiated instruction was developed in response to the tendency in many countries to include students of varying abilities in the same classroom environment. Individualized instruction can thus be viewed as a component of differentiated instruction.

- Activities of teachers in differentiated instruction

Instructors, according to Smit and Humpert (2012), are a crucial component influencing student learning. They must create and carry out instructions (Tobin & Tippett, 2012; Watts-Taffe, 2012). According to Tomlinson et al. (2003), every teacher should be able to give differentiated teaching. Teachers can plan differentiated teaching ahead of time, but they can also adopt it after previous classes have proven unsatisfactory for specific kids (Landrum & McDuffie, 2010; Roy et al., 2012). However, simply giving differentiated training is insufficient. According to Tomlinson et al. (2003), differentiated education must be successful, and this is where most teachers struggle when offering differentiated instruction. The first actions of giving successful differentiated teaching involve a variety of activities. According to Goddard et al. (2010) and Watts-Taffe et al. (2012), instructors must communicate and discuss differentiated teaching ideas with one another in order to become significantly more effective at giving differentiated education. They can discuss their perspectives on differentiated teaching

and how they plan to execute it in the classroom to have a better understanding of instructional changes (Gettinger & Stoiber, 2012). According to Chamberlin and Powers (2010) and Goodnough (2010), instructors must remember that differentiated teaching is not a formula. It is theoretically directed and may be put into practice in a variety of ways. Differentiation procedures are neither easy nor straightforward (Hayes & Deyhle, 2001). According to Chamberlin and Powers (2010) and Smit and Humpert (2012), teachers must begin small. As a result, instructors should not immediately use differentiated instruction in all of the disciplines they teach (Tomlinson et al., 2003). When instructors have provided excellent differentiated instruction in one topic, they can go on to other subjects. If instructors have reviewed various components of differentiated education and have agreed to use it, they must first notice the distinctions between pupils (Chamberlin & Powers, 2010; Smit & Humpert, 2012). According to Watts-Taffe et al. (2012), differentiated education is essential for respecting diversity. Differentiated instruction is impossible when teachers neglect student differences for any reason. As a result, teachers must recognize each student's unique requirements and view pupils as individuals (Santangelo & Tomlinson, 2012). According to Chamberlin and Powers (2010), when instructors notice diversity, they embrace students for who they are. The next section will go through what teachers really do in the classroom while offering individualized teaching.

-Basics of Differentiated Instruction Approach

The instructor has the ability to differentiate education in four areas: content, procedure, product, and environment. Teachers examine the purpose of a class before providing students with flexible alternatives concerning the information they learn to accomplish the objective, ranging from subject or topic to style or presentation. Teachers use process differentiation to differentiate how pupils learn. One method for

achieving process differentiation is to group students depending on their unique preparedness or to complement each other. Another strategy is to change the method concepts are taught, such as through visual, aural, or kinesthetic learning. Product diversification refers to the different sorts of assignments that students make. A teacher may assign a written report, a tale, a song, a speech, or an art piece to pupils to explain a topic. Learning is also influenced by the classroom environment. Changing physical elements in the classroom, such as how desks are set up or organized, or where students can sit (on beanbags, for example), helps differentiate the classroom environment, which can also involve adjustments to routines and habits. To guarantee that all students pursue the same goals (even if they take various paths to get there), differentiated education must be standards-based. Diagnostic assessment and learning inventories should be the first actions for instructors. The goal is to set baselines for individual students. Then the instructor can identify tactics to help each student achieve the objectives and deliver custom-tailored content.

Differentiated instruction is evident when instructors have:

- Offer students options to choose from in assignments or lesson plans.
- Provide multiple texts and types of learning materials.
- Utilize a variety of personalized learning methods and student assessments.
- Customize teaching to suit multiple forms of intelligence.

Instructors must clearly communicate the learning goals and success criteria for differentiated teaching to be successful. Differentiated learning thrives in a classroom setting where students are working toward common goals while maintaining a development mentality. Teachers must recognize and respond to student needs while also fostering a supportive classroom atmosphere in which students accept differentiation for

themselves and their peers. Knowing your students' specific requirements allows you to educate them more effectively, with the objective of enhancing cognitive and academic achievements. There are seven methods of differentiation: Teachers may accommodate a broad range of talents in the classroom by adopting these approaches.

The first way is flexible-pace learning: activities are generally finished in a certain period of time, which normally accommodates slower-paced learners. This can result in quicker learners being held back by the pace of their classmates, while slower employees feeling pressured and incapable of learning at the required rate. Using a flexible approach to time-based assignments, however, speedier students are allowed to do extension tasks, allowing other students to complete their workout at a more comfortable pace.

The second method is collaborative learning, which is promoting group work, which is ideal for encouraging shyer pupils to participate more in class. Forming mixed-ability groups of kids allows high achievers to express themselves and lower ability children to collaborate with and learn from their classmates. Allocating duties to each member of the group can also assist students arrange themselves based on their various talents and abilities? This allows less capable pupils to contribute and boosts their confidence.

The third option is progressive assignments, which allow teachers to assign various activities or exercises to different pupils based on their ability. However, there are a few drawbacks to this strategy. Not only does it publicize student abilities, which may have bad social consequences, but it also necessitates significantly more administrative work for the instructor. A progressive worksheet, on the other hand, that becomes more complicated as the learner progresses, is a more sensitive option. Allowing students who study at a slower rate to work at their own pace also provides a vehicle for more

academically proficient pupils to get to more difficult problems more rapidly.

- Digital resources: By utilizing interactive tools and digital apps, mixed-ability courses are able to approach a topic or subject from a variety of perspectives. In certain circumstances, using digital tools might emphasize a skill or interest in pupils with less academic aptitude, whilst others may work more effectively with non-traditional materials and mediums. This kind of diversification allows for the use of various resources, platforms, and technologies to achieve the same learning objective and give students confidence in their digital abilities.

-Verbal support: This differentiation strategy relies heavily on verbal interaction. Teachers may recognize various learning skills and tailor their voice explanations and support to different academic levels. Using focused questions can elicit a variety of responses from students with varying learning profiles. This strategy is based on teacher-pupil contact and the educator's capacity to engage pupils in both basic and complicated discussion based on their learning requirements.

-Variable outcomes: Rather than assigning a task with a single conclusion or 'correct' response, a more interpretative approach to an exercise allows pupils to arrive at a more individualized result. Students of various abilities will get outcomes that correspond to their degree of comprehension and learning. The risk of lower ability pupils sliding too low can be minimized if clear instructions and a set of rules are specified prior to assigning the work.

-Ongoing evaluation: Regular assessment and feedback helps instructors to adapt their teaching approaches to the demands and learning situations of their diverse students. Assessment is now done both during the year and at the end, and there is room to completely rethink the end-of-year reporting procedure. Teachers can use an interactive front-of-class display, such as the

Active-panel, to conduct anonymous or open polls, end-of-class evaluations, and pop quizzes. Educators can therefore be notified about levels of knowledge, interpretation, and learning in real time. This adaptable strategy caters to all learning profiles at the most useful period, rather than retrospectively (Promethean, 2017).

-Mathematical Learning Style

Differences in students' mathematical learning styles emerge quite early in their development. There are many mathematical learning styles such as: the Mastery style: People in this category tend to work step-by-step. The Understanding style: students in this category tend to search for patterns, categories, and reasons. The Interpersonal style: People in this category tend to learn through conversation and personal relationship and association. And finally The Self-Expressive style: People in this category tend to visualize and create images and pursue multiple strategies.

- Why Students who choose the Mastery learning style benefit most from instructional methods that stress step-by-step examples and repetitive practice. This group of students struggles with abstractions, explanations, and non-routine problem solving. They describe mathematics as the ability to calculate and compute.
- • Students who prefer the Understanding learning style benefit the most from teaching methods that highlight concepts and the rationale behind mathematical processes. These kids struggle with assignments that require teamwork, application, and repetitive drill and practice. Mathematics is defined essentially in terms of explanations, reasoning, and proofs.
- • Students who prefer the Interpersonal style learn best when teachers stress cooperative learning, real-world circumstances, and links to everyday life. Students in this category have difficulty with autonomous seatwork,

abstraction, and non-routine, out-of-context problem solving. They define mathematics largely in terms of practical applications.

- Why Students who prefer the Self-Expressive style learn best from instructional methods that stress imagery and exploration. Step-by-step calculation and routine drill and practice are difficult for these kids. Mathematics is defined essentially in terms of non-routine problem solving.

These many mathematical learning approaches mirror cognitive diversity among mathematics students. Understanding these approaches allows teachers to address students' learning strengths and shortcomings. Computation abilities (Mastery), explanations and proofs (Understanding), cooperation and real-world application (Interpersonal), and non-routine problem solving (Self-Expressive) will be enhanced if teachers combine all four types into a math course (Tang, et al.1999; Tomlinson, 2001; Tomlinson, 2003).

Many research papers discussed the issue, Kado et al. (2022) used the pre-test and post-test quasi-experimental study approach to investigate the effect of differentiated tactics on grade eleven mathematics students. This research included 64 grade eleven pupils. The idea of derivative was taught to the experimental group (N=32) using a differentiated education technique, whereas the control group (N=32) was taught using a standard one-size-fits-all strategy. To assess the variations in their learning successes, a Conceptual Understanding Test on the Derivative (CUTD) was administered as a pretest and posttest group. A t-test examination of the pretests revealed no significant differences, indicating that the learning capacities of the experimental and control groups on the concept of the derivative were essentially equivalent. In the post test analysis, however, a statistically significant difference in favor of the experimental group over the control group was identified. It was

suggested that mathematics instructors and educators employ differentiated instruction for teaching and studying derivative. The researchers also advocated for the adoption of differentiated education over a longer period of time and with a bigger sample size.

Muthomi and Mbugua (2014) wanted to see if there was a difference in accomplishment when students were taught utilizing the Differentiated Instruction method. The study used the quasi-experimental approach, specifically the Solomon Four-Group design. The study was conducted at eight provincial secondary schools in Meru County, Kenya. The subjects were made up of three pupils, and the sample size was 374. The participating schools were chosen using a simple random selection procedure. The Mathematics Achievement Test gave the necessary information. The hypothesis was tested at a significance level of = 0.05. The results showed that Differentiated Instruction greatly enhanced students' mathematics achievement, which may motivate curriculum makers to use Differentiated Instruction in ways to teaching mathematics to improve student accomplishment.

A quasi-experimental study was undertaken by Tambaoan and Gaylo (2019) to evaluate the impact of tailored education, an approach that may accommodate to learners' variety, on their academic performance and engagement in Basic Calculus. During the second semester of the 2017-2018 school year, sixty Grade 11 students from the Science, Technology, Engineering, and Mathematics (STEM) strand of Bukidnon State University Secondary School, Malaybalay City participated. Differentiation lessons and apps were created. A panel of experts assessed the validity and reliability of a researcher-created academic performance test and engagement measure. The data was analyzed and interpreted using the following statistical techniques: mean, standard deviation, frequency, percentage, one-way analysis of covariance (ANCOVA), and paired t-test.

The findings demonstrated that learners' academic performance when taught using differentiated teaching was extremely satisfactory, but learners' academic performance when taught using traditional instruction was Fairly Satisfactory. There was a statistically significant difference in academic achievement between the two groups of learners, with tailored education winning out. Furthermore, the experimental group's involvement level was Moderate before and after the intervention, with a statistically significant difference ascribed to differentiated teaching. Karadag and Yasar (2010) wanted to know how varied instruction affected students' attitudes in a Turkish class. The study was done with 5th grade kids in Turkey using an action research technique. The study's data were gathered using the Turkish Course Attitude Scale and semi-structured interviews. The qualitative data was evaluated using the "NVivo 8" tool, and the quantitative data was examined using the SPSS program. The findings of this study demonstrated that a diversified education strategy favorably improved students' perceptions about Turkish courses.

METHODOLOGY

As mentioned above, differentiated education strategy uses many approaches like: flexible-pace learning (FPL), collaborative learning (CL), progressive tasks (PT), digital resources (DR), verbal support (VS), variable outcomes (VO) and ongoing assessment (OA). Each aspect of these approaches contribute in constructing a differentiated education mathematical system (DEMS), the contribution of each approach is represented mathematically as implementation index. The questionnaire suggested here-see appendix 1- is used here with the help of Likert scale to calculate the contribution of each aspect in implementing the differentiated education system. Table 1 below shows the statistical standard for the interpretation of the arithmetical averages of variants DES latents. The

questionnaire is composed of 21 questions, the sample is selected randomly from the students at Public Authority for Applied Education and Training- High Institute of Energy-Kuwait, about 50 students were respond about the questionnaire most of them answers all questions.

Table 1. Statistical standard for the interpretation of the arithmetical averages of variants DEMS latents

Implementation index II	$0 < II \leq 20\%$	$20 < II \leq 50\%$	$50 < II \leq 60\%$	$60 < II \leq 80\%$	$80 < II \leq 100\%$
Interpretation	Poor	Fair	Good	Very Good	Excellent

RESULTS AND DISCUSSION

-Data analysis and interpretations

To estimate the Implementation Index (II) for each DEMS latent, the total score average for all received responses were computed and divided by (5) times the number of questions for this latent), as shown in Equation 1 below. The number "5" refers to the used Likert scale which is here "five points". The results can be interpreted according to Table 1.

$$\text{Implementation Index (II\%)} = \frac{\sum \textit{Scores average for each question}}{(5) * \textit{Number of Questions}} \times 100 \quad (1)$$

The first latent, "flexible-pace learning (FPL)" is chosen as an example to calculate the score average and the level of implementation for this variable. As shown in Table 2, the implementation index for flexible-pace learning (FPL) can be computed as follows:

$$\text{Implementation Index (II\%)}_{\text{MSAE}} = \frac{3.8 + 3.6 + 4.5}{(3)(5)} \times 100 = 79.33\%$$

According to table 1, the implementation of FPL is "Very Good". Similarly, the implementation index of all DEMS latent, namely; collaborative learning (CL), progressive tasks (PT), digital resources (DR), verbal support (VS), variable outcomes

(VO) and ongoing assessment (OA) were calculated and presented in the table 2, table 3, Table 4, table 5, table 6, table 7 and table 8 respectively, the overall results are tabulated in Table 9. The overall average of implementation Index for the DEMS is found to be 81.067 %, that is mean the considered education system is excellent implementer for DEMS.

Table 2. Implementation index for Flexible-pace learning (FPL)

No.	Item	Score average
1	Instructors use different methods of learning like texts, pictures, diagrams, solved examples, exercises related to students' abilities	3.8
2	Instructors gives the opportunity and time to slow students in solving math problems	3.6
3	The instructor accepts the feedback from students and sometimes repeat the solution of some problem for more understanding	4.5
Average of FPL practice		**3.967**
FPL implementation index		**79.33 %**
Interpretation		**Very Good**

Table 3. Implementation index of collaborative learning (CL)

No.	Item	Score average
4	The instructors allow the students to exchange ideas in the class.	4.0
5	The instructors encourage more smart and active students to help others by forming mixed ability "Groups"	4.2
6	The instructors allow discussion of math problems between different levels of learners	3.8
Average of CL practice		**4.0**
CL implementation index		**80.00%**
Interpretation		**Excellent**

Table 4. Implementation index for Students progressive tasks (PT)

No.	Item	Score average
7	Instructors give simple math exercises then more complicated problems	3.8
8	The given exercises encourage students to more progressive in the math problems	3.9
9	The instructor track the weak students to solve math problems and improve their performance by using worksheets	4.0
10	Activities are organized to improve performance	3.8
Average of PT practice		**3.875**
PT implementation index		**77.50 %**
Interpretation		**Very Good**

Table 5. Implementation index for digital resources (DR)

No.	Item	Score average
11	Instructors use digital resources in their lectures like videos and E-books	4.2
12	Instructors use more clear procedures screens and diagrams or flowcharts	4.2
13	Instructors used non-traditional resources and mediums	4.2
Average of DR practice		**4.2**
DR implementation index		**84.00 %**
Interpretation		**Excellent**

Table 6. Implementation index for verbal support (VS)

No.	Item	Score average
14	Instructors using targeted questioning which can produce different responses in students of different learning profiles	4.0
15	Instructors use techniques which relies on teacher-students interaction	4.5
16	Instructors use the dialog technique during lessons	3.8
Average of VS practice		4.1
VS implementation index		**82.00 %**
Interpretation		**Excellent**

Table 7. Implementation index for variable outcomes (VO)

No.	Item	Score average
17	Rather than setting a task with a single outcome or 'right' answer, instructors taking a more interpretive approach to an exercise gives students the flexibility to arrive at a more personalized result	4.4
18	. Students of different abilities will arrive at outcomes that match their level of understanding and learning.	4.2
19	If clear direction and a set of rules are formalized prior to setting the task, the risk of lower ability students falling too low can be avoided	3.5
Average of VO practice		4.03
VO implementation index		**80.66 %**
Interpretation		**Excellent**

Table 8. Implementation index for ongoing assessment (OA)

No.	Item	Score average
19	Instructors used regular assessment and feedback, allows teachers to adapt their teaching methods according to their various pupils' needs and learning conditions.	4.4
20	Teachers perform anonymous or open polls, end-of-class assessments and pop quizzes.	4.2
21	Instructors used ongoing assessment and hence educators can be informed in the moment about levels of understanding, interpretation and learning	4.0
Average of OA practice		4.2
OA implementation index		**84.00 %**
Interpretation		**Excellent**

Table 9. Summary for the implementation level results of each construct latent variable

Construct Latent Variable	Mean ($\bar{x}$)	Variance (s^2)	Implementation Index (%)	Interpretation
Flexible-Pace Learning (FPL)	3.967	0.223	79.33	Very Good
Collaborative Learning (CL)	4.0	0.04	80.00	Excellent
Progressive Tasks (PT)	3.875	0.018	77.50	Very Good
Digital Resources (DR)	4.2	0.000	84.00	Excellent
Verbal Support (VS),	4.1	0.130	82.00	Excellent
Variable Outcomes (VO)	4.03	0.223	80.66	Excellent
Ongoing Assessment (OA)	4.2	0.040	84.00	Excellent

Overall LBES implementation level	**4.05**	**0.096**	**81.07**	**Excellent**

Figure 1 illustrates visually a comparison between implementation indices of all model latent. Figure 2 represents radar chart for implementation indices values of DEMS latent variables, the figure reveals that the implementation level for the selected education systems is between 77.50% and 84.00 % in all lean practices.

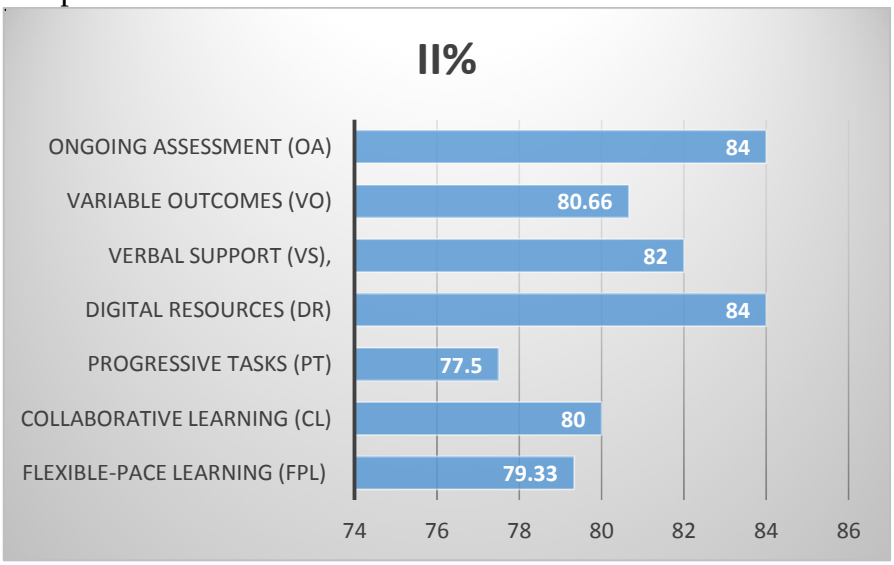

Figure 1. Visual comparison of Implementation index between DEMS's latent Variables

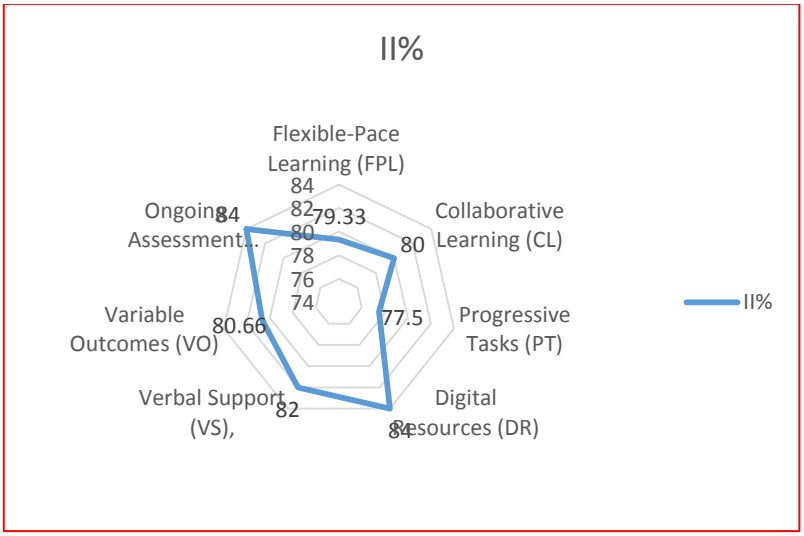

Figure 2. Radar Chart for Mean of different latent variables of LBES.

As shown in last tables and figures, the factors or latents contributing in using or constructing differentiated education mathematical system (DEMS) are divided into seven divisions: flexible-pace learning (FPL), collaborative learning (CL), progressive tasks (PT), digital resources (DR), verbal support (VS), variable outcomes (VO) and ongoing assessment (OA). Such factors contribution in implementing DEMS is measured by calculating implementation index (II). The results showed that IE for such factors are 79.33% for FPL, 80.00% for CL, 77.50% for PT, 84.00% for DR, 82.00% for VS, 80.66% for VO, and 84.00% for OA. The total implementation index for all factors is found to be 81.70% which indicated excellent interpretation

CONCLUSIONS:

Overall, modern teaching methods should be flexible enough to give the best vehicle to education for all learning profiles. By first identifying different students' needs, understanding how to best engage them, and employing a

mixture of these methods of differentiation, pupils of all abilities will have the best possible opportunity to learn. In this study a differentiated education mathematical system is implemented by investigated the factors or latents that are contributing in constructing such system via implementation index values. It is found that DEMS is a promising approach in mathematical education and can be used for more effective material understanding for all levels of students inside the class.

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