



The Paradigm 3E of Supporting Each Student's Learnings and Findings In the Case of English Language Teacher Training at MNUE

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Abstract. This paper presents the findings of experiments on supporting students' learning by differentiating content, processes, and products in response to the student's readiness, interest, and learning profile through classroom management. The results showed that differentiated instruction throughout the 3E paradigm of engagement, effort, and earning positively influenced student's learning achievement. Every student has to engage and make an effort to learn; as a result, they may gain some knowledge. The three actions happen when the teaching and learning are compatible. Successful teaching depends on the teacher's ability to differentiate instruction. This model proposes a 'one size does not fit all' methodology and classroom management, inviting students within the learning context to become engaged in the process. There are two critical questions to clarify this research of how to support learning, considering the differences between students, and will there be progress in education by considering the differences between students. Gardner's multiple intelligences and Visual-Auditory-Kinesthetic styles are related to the individual learning differences. We developed assignments with choice for the students and observed why they chose and how they performed them. Their intention was suitable for their interest, learning style, and readiness level; their success was higher.

Keywords: Readiness · Interest · Learning profile · Engagement · Effort · Earning

1 Introduction

To date, we teach a "one size fits all" concept which does not meet all students learning styles successfully, since we know that every student is unique. Learning is a process that consists of engagement, effort, and earning (3E). Teachers should have wisdom to know the differences between students before implementing differentiated instruction in their lessons. Research teachers have found that students' learning is easier and faster when

educators use a variety of strategies to modify their delivery to students' level of readiness [1] and interest and learning profile [2, 3]. Student learning differentiation was focused on their readiness, interest, and learning profile. In classes where everyone does the same task, the teacher will meet about a quarter of the students' needs. Unfortunately, we forget the psychologists' and educational researchers' theories and developing teachers' ability to differentiate instruction for all students to get the same result. Teachers' survey says that implementing differentiated instruction is time-consuming and difficult. Therefore, our work has found a way to decide the problem by providing each student's engagement, effort, and earning, developing appropriate tasks for each student, and allowing them to select from the assignment variations. Teachers are charged with the responsibility of moving ALL students along a pre-determined path, usually with pre-determined curricula, towards a goal of adequate yearly progress. Teachers should have the wisdom to know students' learning needs and strengths, and deliver content through various classroom activities in a way that suits their different learning abilities, interests, and styles [4].

Differentiated instruction are methods and strategies used in teaching periods. Such class activities have great importance for making subjects more understandable and tangible for students. In this context, a differentiated teaching approach that accounts for personal differences within a class, considers different students' different skills and learning needs, and draws on students' strengths gains importance [5, 6; 7; 8, 9, 10]. The differentiated teaching approach, which was first described by [10] involves paradigms such as the theories of social constructivism, multiple intelligence, thinking styles, Maslow's hierarchy of needs, and brain-based learning that consider learners the focal point. The differentiated teaching approach can also be defined as a learning experience. Teachers use various approaches to introduce students to the content of program, and activities designed for students so that they can learn meaningfully, access their knowledge and opinions, and choose to display what they have learnt [11]. According to differentiated teaching is an educational approach that will compensate for students' personal requirements by increasing both their learning and motivations. [11] defines differentiated teaching as a series of strategies that help each student from the moment their teacher enters the class. Multiple teaching strategies are used to provide students at all levels a better understanding of the subject, to increase their success and motivation, and to make them responsible for their own learning. As differentiated teaching reaches specific targets, it is also a strategy that offers various approaches based on the instructor's teaching profile, skills, interests, and pre-knowledge as well as the students' learning styles [11–13]. This strategy is generally used to address different readiness levels. With such a design, students with low, medium, and high pre-knowledge are able to learn the same subjects at suitable difficulty levels [11, 12]. Differentiated teaching is especial for children who lack sufficient knowledge and skills in any subject significant to their academic advancement [13]. Differentiated instruction is a means of teaching to all children to help them reach a common goal, regardless of the path they take to get there. Since Tomlinson [9] introduced and defined differentiated instruction, many others have created their own definitions. King Shaver [14] defined differentiated instruction as a deliberate and conscious method of planning and teaching that provides multiple avenues of learning toward clearly defined goals. The theory of differentiated instruction

is based upon teachers focusing on what is essential in the learning, attending to student differences, teacher/student collaboration regarding learning expectations, and uniting assessment and instruction [15]. It is imperative not to exclude any child in a classroom, so a differentiated learning environment must be provided by the teacher.

Using differentiated instruction, educators have the greatest potential to alter the lives of struggling students to become successful students. Evans and Waring argued differentiated instruction is not teaching to students one by one. Instead, it requires the educator to understand the strengths and needs of all students in their classrooms.

The reality in education is that the students learn at different rates and by different methods [16]. Differentiated instruction is widely known as a method of teaching that meets the diverse needs of students. However, little information is available concerning the actual execution of differentiated instruction in the classroom by teachers. Many educators pay lip service to the idea of meeting the needs of all students and teaching them in ways that best enable them to learn; however, in reality, the majority of teachers still teach in the same way by aiming down the middle (Irujo, *Differentiated instruction: We can no longer just aim down the middle.*, 2004). Educators who are responsive to the increasing diversity among the student population in today's classrooms believe that "classes should include students of diverse needs, achievement levels, interests, and learning styles, and instruction should be differentiated to take advantage of the diversity, not ignore it".

Readiness

Readiness was defined as where the student was in terms of an understanding or skill [10]. Differentiating by student readiness level requires educators to assess prior knowledge and determine what students knew and where students were at.

Interest

Several researchers have studied student interest, such as Oxford and Csickszentmihalyi. There were three primary goals of identifying student interest: it allowed the student to form connections between personal life and learning, it enabled the student to utilize the familiar, and it fostered intrinsic motivation to learn [8].

Learning Profile

A student's learning profile could be influenced by learning style preference, intellectual abilities, and preferences related to background, culture, and gender.

2 Methodology

We surveyed 76 sophomore students studying in the English teachers training class of the School of Humanity, Mongolian National University of Education. The 76 students are divided into three groups. We experimented with differentiated instruction in the 32-h seminar 'English grammar-3' for 76 students in three groups.

At first, we determined students' current level of knowledge by assessments (Table 1.). There are 24 students' assessments of the first group. Then we studied students' learning styles and intelligence abilities to recognize the differences between students (Table 2.). There are eight types of intelligence, and we numbered them as 1-Verbal-linguistics 2- Logical-Mathematical, 3- Musical, 4- Visual-spatial, 5- Bodily-kinesthetic, 6- Intrapersonal, 7- Interpersonal, 8- Naturalistic. Students took the VAK test to determine their learning preferences and Gardner's multi-intelligence test for intelligence abilities.

Table 1. Readiness

1 (62) D-	2 (62) D-	3 (64) D	4 (64) D	5 (65) D	6 (67) D
7 (71) C-	8 (71) C-	9 (74) C	10 (74) C-	11 (76) C	12 (77) + C
13 (81)B-	14 (84) B	15 (86) B	16 (87) B	17 (88) + B	18 (88) + B
19 (92) A-	20 (94) A	21 (95) A	22 (96) A	23 (96) A	24 (96) A

There are many ways to determine student learning styles. In one of the most common learning style tests, Walter Burke Barbe revealed the learning models of each student and the typical learning patterns (VAK) of the class. We used 30 questions of the VAK test to determine student learning styles.

Secondly, we experimented by selecting differentiated teaching activities for student choices (Table 4.). Then we observed student engagement during differentiated instruction and compared it with the engagement of traditional teaching methods.

Then we observed readiness level group work. There are two primary methods for setting up student groups: homogeneous, where the same ability levels arrange students, and heterogeneous, where students from different ability levels (or other factors) are intermixed so that each group has a broad representation of students. Rows can organize collaborative learning for homogeneous activities and columns for heterogeneous group work.

Table 1. shows the readiness level of students. Teachers can tailor assignments and activities to student readiness level.

There's good relationship with Gardner and VAK approaches. Gardner's multiple intelligences and VAK learning styles are related to the learning process of 76 students.

Table 3. describes the relationship between VAK and Gardner test, which is 75%. 1. Normally, the null hypothesis (H0) indicates that both variables are independent, while the other hypothesis (H1) indicates that the variables are to some extent related or dependent. The correlation between the VAK and GARDNER was found 75% by Chi square test.

We develop activities in Table 4. for every eight types and three learning styles for student choice according to this result. We applied the choice methodology in teaching the 76 students in the classroom and observed their engagement process. The results show that VAK model is more effective than conventional model in learning English grammar. The results show that VAK model is more effective than conventional model in learning English grammar (Table 5).

Educational psychology includes the social, emotional, and cognitive processes that are involved in learning throughout the entire lifespan. The amount of learning and personal growth associated with any educational program is directly proportionate to the quality and quantity of student involvement in that program. Engagement is self-directed, meaningful involvement with materials or applications based on cognitive

Table 2. Correlation of student engagement VAK, and multiple intelligences

Engagement1					Engagement2		
VAK	Gardner	N	mean	sd	mean	sd	increase
V	1	1	18.00	.	28.50	.	10.5
	2	5	20.00	.000	29.80	.447	9.8
	4	5	18.00	3.937	27.40	4.775	9.4
	6	7	13.57	3.359	25.93	3.168	12.36
	7	3	19.00	1.732	29.33	1.155	10.33
	Total	21	17.14	3.745	27.81	3.223	10.67
A	1	3	16.00	5.196	23.33	6.028	7.33
	3	3	15.33	4.726	21.00	3.000	5.67
	4	3	13.67	3.786	21.33	4.481	7.66
	6	4	17.75	3.862	26.38	5.186	8.63
	7	11	15.73	4.197	26.41	3.936	10.68
	Total	24	15.79	4.054	24.71	4.618	8.92
K	1	1	11.00	.	27.00	.	16
	2	6	19.17	1.602	28.67	2.160	9.5
	4	6	16.83	3.189	27.83	2.229	11
	5	3	18.67	1.155	25.33	5.686	6.66
	6	10	15.20	4.442	25.10	4.683	9.9
	7	2	14.50	4.950	19.75	8.132	5.25
	8	3	18.67	1.528	27.83	2.255	9.16
	Total	31	16.77	3.640	26.32	4.261	9.55
Total	1	5	15.40	4.506	25.10	4.930	9.7
	2	11	19.55	1.214	29.18	1.662	9.63
	3	3	15.33	4.726	21.00	3.000	5.67
	4	14	16.57	3.694	26.29	4.388	9.72
	5	3	18.67	1.155	25.33	5.686	6.66
	6	21	15.14	4.090	25.62	4.147	10.48
	7	16	16.19	3.987	26.13	4.738	9.94
	8	3	18.67	1.528	27.83	2.255	9.16
	Total	76	16.57	3.792	26.22	4.245	9.65

challenge and motivation [17]. Research has demonstrated that engaging students in the learning process increases their attention and focus, motivates them to practice higher-level critical thinking skills, and promotes meaningful learning experiences. Student Engagement (Glossary of Education Reform. 2016) refers to the degree of attention,

Table 3. VAK and GARDNER chi square test

Crosstab					
		VAK			Total
		V	A	K	
Gardner	1	1	3	1	5
	2	5	0	6	11
	3	0	3	0	3
	4	5	3	6	14
	5	0	0	3	3
	6	7	4	10	21
	7	3	11	2	16
	8	0	0	3	3
Total		21	24	31	76
Chi-Square Tests					
		Value	df	Asymp. Sig. (2-sided)	
Pearson Chi-Square		35.303 ^a	14	.001	
Likelihood Ratio		40.490	14	.000	
Linear-by-Linear Association		.260	1	.610	
N of Valid Cases		76			

a. 18 cells (75.0%) have expected count less than 5. The minimum expected count is .83.

curiosity, interest, optimism, and passion students show when they are learning or being taught, which extends to the level of motivation they have to learn and progress in their education. We evaluate student psychological, cognitive, and behavioral engagement by 30 scores, 10 for each. There are many items in one task students can choose from them (Table 6).

The alpha coefficient for factor 1, measured by five variables, is .948, indicating relatively high internal stability. The correlation coefficient between the internal variables of the "psychological engagement" factor is relatively high. "1. Becoming interesting" and "4. Inspiration" correlation coefficient .605 high correlation, "5. Courage" correlation coefficient. 666 highly dependent, "2. Motivation" correlation coefficient .695 high correlation, "3. Individualization by level".808 correlation is very high. "2. Motivation" and "3. Individualization by level" coefficient .856, "4. Inspiration" correlation coefficient.828, "5. Courage" correlation coefficient. Variables such as 897 have a very high correlation with each other. "3. Individualization by level" and "4. Inspiration" correlation coefficient .849, "5. Courage" correlation coefficient. Variables such as 850 are highly correlated. "4. Inspiration" and "5. Courage" correlation coefficient. Variables such as 851 are highly correlated.

For factor 2, the test result is measured by five variables. The reliability coefficient or alpha coefficient is .723, indicating that the internal stability is sufficient. The correlation coefficient between the internal variables of the "Cognitive engagement" factor

Table 4. Planning activities according to students' intellectual abilities and learning styles

Multiple intelligence skills	Activities
Verbal-linguistics (Word smart) AUDITORY learners: love verbal instructions and follow them easily	-Participate in discussions, debates and brainstorm in small group
Logical -Mathematical (Logic smart) VISUAL learners:love graphs, maps, diagrams, flowcharts and written instructions	-Solve problems and solve puzzles based on logical thinking -Predict the outcome based on the situation -Statistical analysis, results analysis, conclusions and reports
Musical (music smart) AUDITORY learners; learn better with music on, provided that it is not distracting	-Write poems and songs -Exercise while listening to music
Visual-spatial (Picture smart) VISUAL learners: are imaginative and can easily picture complex scenarios, images or ideas without reference	-Participate in artistic activities such as drawing and playing -Read and create maps -Think and reflect using pictures -Create and explain photo albums -Think, think, and use pictures
Bodily-kinesthetic (Body smart) KINAESTHETIC learners are good at hands-on problem solving. Have a good sense of direction and restless or fidgety in the classroom	-Use basic body parts to measure things -Speak with conviction -Learn folk dances that express a unique culture -Draw using simple tools and think about your scribbler -Designing things -Moving exercises, developing and using video lessons
Intrapersonal (self-smart) KINAESTHETIC learners; may learn by drawing and doodling.	-Work independently -Write essays and reflections -Keep notes and journals
Interpersonal (people smart) AUDITORY learners; understand and process information by talking it through; Would rather record a lesson or lecture than take notes; Are good at oral presentations	-Work in teams -Teach to other students, plan and implement mini-lessons -Organize an interview -Organize team formation, team selection, and assignment -Talk and solve problems together
Naturalistic (Nature smart) KINAESTHETIC learners absorb information primarily through movement in a physical way.	-Read, classify and systematize natural objects and phenomena -Do an online search for plants and animals -About loving, protecting and caring for nature, plants and animals -Think and create useful things of loving, protecting and caring for nature, plants and animals

is relatively low. “1. Create”and“ 5. Remember” correlation coefficient .089 is a very low correlation, “4. Understand” correlation coefficient .127 very low correlation, “3. Application” correlation coefficient.378 is less correlated, “2. Application” correlation

Table 5. Psychological engagement reliability

Psychological engagement							Kronba alpha
Correlation							
Nº	Variables	1	2	3	4	5	
1	Become interesting	1					.948
2	Motivate	.695	1				
3	Individualize	.808	.856	1			
4	Inspire	.605	.828	.849	1		
5	Courage	.666	.897	.850	.851	1	

Table 6. Cognitive engagement reliability

Behavioral engagement							Kronba alpha
Correlation							
Nº	Variables	1	2	3	4	5	
1	Create	1					.723
2	Analyze	.755	1				
3	Apply	.378	.495	1			
4	Understand	.127	.222	.584	1		
5	Remember	.089	.053	.201	.517	1	

coefficient .755 is highly correlated. "2. Evaluation" and "5. Memory" correlation coefficient .053 is a very low correlation, "4. Understand" correlation coefficient .222, low correlation, "3. Application" the correlation coefficient of .495 is moderately correlated. "3. Application" and "5. Memory" correlation coefficient .201 is less relevant, "4. The "understand" correlation coefficient is .584 moderately correlated. "4. Understand" and "5. Remember" correlation coefficient .517 is moderately correlated (Table 8).

For factor 3, the test result is measured by five variables. The reliability coefficient or alpha coefficient is .753, indicating sufficient internal stability. The correlation coefficient between the internal variables of the "behavioral engagement" factor is relatively low. "1. Attention" and "5. Responsibility" correlation coefficient .032 very low correlation, "3. Consistency" correlation coefficient .223 less correlation, "4. Correct self-esteem".263 less correlated, "2. The "Believe" correlation coefficient is .504 moderately correlated. "2. Believe" and "5. Correlation coefficient .285, "4. Correct self-esteem" correlation coefficient .222, "3. Consistency" correlation coefficient .295 less correlation. "3. Perseverance" and "5. Correlation coefficient .550, "4. Correct self-esteem" correlation coefficient .604 is highly correlated. "4. The correlation coefficients "correct self-esteem" and "5. Responsibility" is .594 moderately correlated (Table 9).

Table 7. Behavioral engagement reliability

Behavioral engagement							Kronba alpha
Correlation							
Nº	Variables	1	2	3	4	5	
1	Attention	1					.753
2	Believe	.504	1				
3	Consistency	.223	.295	1			
4	Correct self-esteem	.263	.543	.604	1		
5	Responsibility	.032	.285	.550	.594	1	

Table 8. Four basic skills of language online training

Correlations					
		Listening	Speaking	Reading	Writing
Listening	Pearson Correlation	1	.808**	-.047	-.014
	Sig. (2-tailed)		.000	.689	.908
	N		76	76	76
Speaking	Pearson Correlation		1	.113	.127
	Sig. (2-tailed)			.332	.274
	N			76	76
Reading	Pearson Correlation			1	.909**
	Sig. (2-tailed)				.000
	N				76
Writing	Pearson Correlation				1
	Sig. (2-tailed)				
	N				

** . Correlation is significant at the 0.01 level (2-tailed).

Table 7. shows students’ engagement progress. Psychological engagement is significant for second language learning; concentration on cognitive engagement will be stated based on psychological engagement, and behavioral engagement will be improved at last.

Visual and kinesthetic learning models are very supportive for students with intrapersonal abilities. The auditory learning model is helpful for verbal-linguistic, musical, and interpersonal students. The kinesthetic learning model enhances the students’ engagement with logical-mathematics and visual-spatial and intrapersonal abilities. The engagement is directly proportional to effort, and the earning is an achievement. IELTS test results of the students shows the correlations of four basic skills of language: listening, speaking, reading, and writing.

Table 9. The correlations between the language skills and multiple intelligences

	Listening	Speaking	Reading	Writing
Verbal-linguistics (Word smart)	✓	✓		
Logical -Mathematical (Logic smart)			✓	✓
Musical (music smart)	✓	✓		
Visual-spatial (Picture smart)			✓	✓
Bodily-kinesthetic (Body smart)			✓	✓
Intrapersonal (self-smart)			✓	✓
Interpersonal (people smart)	✓	✓		
Naturalistic (Nature smart)			✓	✓

Table 10. Student grade statistics

	After experiment grade	Before experiment grade	Grades
Learners	76	76	76
Average	85.1	76.0	9.1
Std	8.8	9.7	7.6
Min	64	49	-7
25%	79.8	68	3.8
50%	84	78	8
75%	91	81.3	12
Max	100	92	34

The students' test result shows the correlations of four basic skills of language; listening, speaking reading, and writing. Students with verbal- linguistics, musical and interpersonal abilities are good at listening and speaking skills and logical- mathematical, visual- spatial, bodily- kinesthetic, intrapersonal and naturalistic abilities are good at reading and writing.

The statistical value of t to test the hypothesis is calculated by the following formula $T = (x - \mu) / (s / \sqrt{n})$.

Here n is the number of samples or 76, s is the standard deviation and 7.6, μ is the predicted value or zero, and x- is the average of the last and previous learning outcomes or 9.1.

Using these values, the statistical value of t was calculated to be $T = 10.44$, which is greater than the critical value of the 5 percent confidence level, 1.6602, so the null hypothesis is rejected at the 5 percent confidence level. In other words, the latter is higher than the previous.

3 Results

Gardner's test results indicated that 7 percent or 5 of all students were verbal-linguistic, 14 percent or 11 of them logical-mathematical, 3 percent or 3 of them musical intelligence abilities, 18 percent or 14 of them were visual-spatial, 4 percent or 3 of them bodily-kinesthetic, 29 percent or 21 students were intrapersonal, 21 percent or 16 of them interpersonal, 4 percent or 3 of them natural naturalistic. Most students have intrapersonal and interpersonal intelligence abilities. Students had different learning styles besides their various multiple intelligence abilities.

The VAK test result shows that 28 percent or 21 students are visual learners, 32 percent or 24 students get knowledge by hearing, and 40 percent or 31 students are kinesthetic learners studying well by doing or moving. Most students have a kinesthetic learning style. The 76 students have different knowledge readiness, intelligence, and learning styles. They have intrapersonal, logical-mathematics, and visual-spatial abilities. Intrapersonal students who learned by V (visual) learning style increased their achievement primarily by 12.36 scores. Auditory learners with interpersonal abilities earned high scores comparing the previous assessment, too, by 10.67 scores. Students with logical- mathematics and natural abilities learn better by K (kinesthetic) learning style. The result suggests that student engagement can be increased based on the modification aligning with the multiple intelligences and learning styles.

From the above, it can be seen that students with logical mathematics (2) and intrapersonal (6) abilities learning by seeing and doing, have the highest grades. Students with high natural and physical ability levels (4) learn by movement and doing. Students with interpersonal (7) and musical abilities learn by hearing. There are 5 students with a linguistic ability (1). One of them has a visual learning style, 3 have an auditory learning style, and one student studies by kinesthetic learning style.

Eleven learners have Logical-Mathematical ability (2). 5 are visual learners, and 6 learn by doing and touching. Two students have the musical ability (3), all learning by hearing. Fourteen students with the visual-spatial ability (4), 5 have a visual learning style, 3 are auditory learners, and 6 are kinesthetic learners. There are 3 students with a body-kinesthetic ability (5), all of these learn through movement. The highest number of students have the intrapersonal ability (6). This group totals 21. 7 are visual, 4 are auditory, and 10 are kinesthetic. While there are 16 students with an interpersonal ability (7), 3 are visual, 11 are auditory, and 2 are kinesthetic. Three students are naturalistic and love protecting nature (8), and all of them have a kinesthetic learning style.

Some research has shown that the effectiveness of intellectual activity can take place at different levels depending on the type of learning. This chi square test proves that intellectual ability and learning styles are interrelated.

When both the teaching method and student learning style comply, the learner brain works effectively and understands the subject more easily.

Table 10. shows that the average score of the previous score was 76, the highest score was 92, and the lowest score was 49, while the average score of the last score increased to 85.1, the highest score was 100, and the lowest score was 64. However, the standard deviation of the previous value is higher than the last value. The results showed that students' learning achievement is increased by 15–20% by applying differentiated instruction approaches.

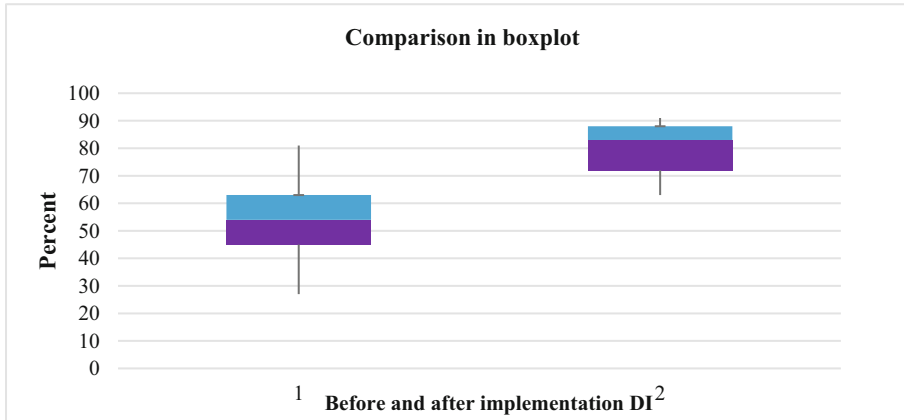


Fig. 1. Achievement comparison

The predictive statistical criteria were also used to analyze whether there was a correlation between the previous grade and the final grade, and whether the final grade was higher than the previous grade.

Therefore, a null hypothesis that there is no difference between the pre- and final-grade results, and a rebuttal hypothesis that the next-grade grade is higher than the previous grade, was tested using the t distribution

Hypothesis

$$H_0: \mu_2 - \mu_1 = 0.$$

$$H_1: \mu_2 - \mu_1 > 0.$$

Here μ_1 is the mean of the previous value and μ_2 is the mean of the last value.

4 Conclusion and Recommendations

We observed increased student engagement in changing the instructions from only one type of listening and saying Ping-Pong questions to reading, writing, listening, and speaking versions together of the same task in English lessons. Traditionally, the teacher gives the same exercise from the student book; 2–3 students raise their hands on each question. When the teacher changed the exercise activity to be open-ended; student engagement was increased and doubled in every performance. The more selective, equitable, accessible, and open the assignment was, the better the students' engagement, effort, and earning was according to their pace. When the teacher shows the correct answer on the screen, students themselves check their performance and find their mistakes. Assignments and activities are tailored to the learner's level, speed, interests, and learning style. The open-ended exercises completed by the learner's creative mind motivate students, and the learner selectively coordinates their learning. Individualization, personalization, collaboration, and open-ended activities allow students to regulate their learning process because they take the time they need to work at their speed. Questions are done in an order chosen by students, and they work individually or collaboratively, all engaged (choice). Students check their answers. All of this decreases teacher workload; in other

words, learning is student-centered, not teacher-centered. Introducing any content at different levels is essential to encourage the students to keep going. The introduction must consist of all three visual, auditory, and kinesthetic styles to engage students with varying types of learning to absorb information well through all the senses.

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