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The Effect of Assessing Students Based on Their Class Work and Homework Performance on the Overall Academic Achievement of Students

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Abstract: Continuous assessment, mainly tests, and assignments, help students to actively engage in the learning process. However, these assessments have been the only type of assessment in most Ethiopian universities, and they affect the student's academic performance from time to time. Therefore, this study aims to evaluate the effect of assessing students based on their class work and homework performance on the overall academic achievement of students. This study is conducted on 4th-year Environmental Engineering undergraduate students. The class contains 25 students of which 6 of them were female. In this study, both primary and secondary data were used. The primary data includes test results, observation, and interviews, and the secondary data was collected from reviewing different published articles. The overall achievement of the students was measured in terms of test results. The collected data was analyzed using Microsoft Excel 2016. The test results before the intervention indicate the average values of test 1 and test 2 were 5.96±1.57 and 5.56±1.76 respectively. It is also noted that there is no significant difference ($P>0.05$) between the two test results. Among the various factors, six major factors that significantly affect the student's academic performance were identified through observations. Previous schooling, family income, student's self-motivation, teacher's delivery style, and assessment are the identified significant factor. The interview result was obtained before the application of the intervention. The result indicates that only 20% of the students are happy with the intervention and thinks that it will affect the improvement of their grade. The majority of the students (72%) are unhappy and think the opposite of the idea and the remaining 8% choose to be abstentious. After the implementation of the intervention, the student's grade improved for both test 1 (7.60±1.04) and test 2 (7.00±1.15). There is also a significant difference ($P<0.05$) between the student's test results before and after the intervention. It can be concluded that the intervention significantly improves the student's test scores, which in turn improves their overall performance. However, further research has to be conducted for enhancing the student's academic performance.

Keywords: Classwork, Continuous Assessment, Homework, Intervention, Students Performance

1. Introduction

Education is the backbone of a country's development [1, 2]. Education plays an important role in public health, social mobility, equity, and better opportunities for employment [3]. Ethiopia is currently taking different measures to improve the quality of education. Universities are expanding all over the country. The number of private colleges is also increasing from time to time. The expansion of universities by themselves can't support and facilitate the development of

the country [4]. This is due to the fact that it is not all about the quantity, it is also about the quality of the education. The education quality of most African countries including Ethiopia is at a lower level [5]. Policy barriers, economic barriers, skill barriers, knowledge barriers, and inflexibility of the curriculum are some of the reasons for the poor quality of education in most African countries [6, 7]. Most of the students from African universities are not competent enough in the international market [8].

Different actions are taking place in Addis Ababa Science and Technology University (AASTU) to improve the education quality including the start-up of curriculum accreditation and laboratory accreditation processes. Different assessment methods are also being used in AASTU to enhance the student's performance. However, these, methods are not achieving their goal. Therefore, engaging the students regularly through assessing students based on their classwork and homework performance is hypothesized to enhance or improve the student's grades academically.

Continuous assessment will help the students to actively engage in the learning process [9–11]. However, tests and assignments have been the only type of continuous assessment in most Ethiopian universities including AASTU. These types of assessments is making the students to be exam-oriented [12, 13]. This indicates that most students want to study when the exam period is close. Moreover, when assignments are given, most students tend to copy from their friends and submit the assignment simply to get a good grade [14, 15]. During the final assessment or final exam, most of the exam-oriented students fall. This might be due to the fact that it is difficult to internalize the whole course within a short period. Moreover, they will be much stressed during exam periods because they might take six or seven courses per semester and they have to study all course materials within a short period. Students, who copy their assignments from their friends will also fail the final exam.

This problem is affecting the quality of the education. It is also becoming difficult to graduate students that have the mindset and capacity to be competent in the market. Therefore, some action should be taken in order to actively engage students throughout the semester so that they could understand and internalize each course, which will in turn improve their grades. Different scholars conducted research on using different methods to improve the student's performance both in continuous as well as final assessment [16–19]. However, it is noted that the study of improving students' performance by assessing them based on their classwork and homework performance was limited in the literature. Therefore, this study aims to evaluate the effect of assessing students based on their class work and homework performance on the overall academic achievement of the students at Addis Ababa Science and Technology University (AASTU). Moreover, this study assesses the status of the students before an intervention (taking action) in terms of their test results, investigates the factors that affect the student's academic performance, and evaluates the effect of class works and home works assessment on the student's performance after an intervention in terms of their test results.

2. Methodology

2.1. Target Groups

This study is conducted on 4th-year Environmental Engineering undergraduate students at AASTU, Ethiopia. The study is conducted in the second semester 2022/33 Academic calendar. The class contains 25 students of which, six were female. The practice was carried out in a course called Solid Waste Engineering.

2.2. Research Approach

The study used both qualitative and quantitative methods to evaluate the current status of the students, to investigate the factors that affect the student's performance, and to evaluate the effect of class works and home works on improving the student's performance.

2.3. Data Collection and Analysis

In this study, both primary and secondary data were used. The primary data includes test results, observation, and interviews. Two tests were given before and after the intervention (students were assessed based on their classwork and homework performance). Observation was used to investigate the factors that affect the student's academic performance. An interview is also used to evaluate the student's response to the new intervention or taken action. The data obtained from the interview is organized into three categories. These are (1) the number of students, who are happy about the intervention and think that it will have an effect on improving their grades, (2) the number of students, who are unhappy about the intervention and think that it will not have an effect on improving their grade, and (3) Abstention. The interview is conducted before the intervention is made. Different published articles were used as secondary data. The collected data was analyzed using Microsoft Excel 2016.

3. Result and Discussion

3.1. Current Status of the Students Before the Application of an Intervention

The current status of the students before an intervention (taking action) was assessed by giving them two tests. The test results are presented in Table 1.

As shown in Table 1, most of both male and female students scored around 50% in both tests. However, their test result is not close to 10. This indicates that the factors that affect the student's performance should be studied and an action or intervention should be made in order to improve the student's grade.

Table 1. *Test results of the students before an intervention was made.*

Students	Number of students	Test scores					
		Test 1 (10%)			Test 2 (10%)		
		Average ± SD	Max	Min	Average ± SD	Max	Min
Male	19	6.05±1.43	9	4	5.67±2.07	9	2
Female	6	5.53±1.89	9	3	5.67±1.37	8	4
Total	25	5.96±1.57	9	3	5.56±1.76	9	2

The statistical analysis of the student's grades based on their gender is presented in Table 2, Table 3, and Table 4. In all three tables, it can be noted that there is significant difference ($P<0.05$) between the two test results for total students and male students. However, there is no significant difference ($P>0.05$) between the two tests for female students.

Table 2. *The statistical analysis of the total student's grades before the intervention.*

Total Students						
Groups	Count	Sum	Average	Variance		
Test 1	25	149	5.96	2.456667		
Test 2	25	139	5.56	3.09		
ANOVA						
Source of Variation	SS	Df	MS	F	P-value	F crit
Between Groups	2	1	2	0.721154	0.399981	4.042652
Within Groups	133.12	48	2.773333			
Total	135.12	49				

Table 3. *The statistical analysis of male student's grades before the intervention.*

Male Students						
Groups	Count	Sum	Average	Variance		
Test 1	19	115	6.052632	2.052632		
Test 2	19	105	5.526316	3.596491		
ANOVA						
Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	2.631579	1	2.631579	0.931677	0.340867	4.113165
Within Groups	101.6842	36	2.824561			
Total	104.3158	37				

Table 4. *The statistical analysis of female student's grades before the intervention.*

Female Students						
Groups	Count	Sum	Average	Variance		
Test 1	6	34	5.666667	4.266667		
Test 2	6	34	5.666667	1.866667		
ANOVA						
Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	0	1	0	0	1	4.964603
Within Groups	30.66667	10	3.066667			
Total	30.66667	11				

3.2. Factors that Affect the Student's Academic Performance

From observing the student's performance in relation to different factors it can be noted that there are many factors that affect the student's performance such as gender, medium of instruction in school, social economic status of the students, study hours, etc. Among many factors, this study identified six major factors that are affecting the student's academic performance.

The first factor identified is previous schooling. Most of the students in the class joined the university from two types of schools. Students from private schools tend to have good communication skills, especially in the English language. Moreover, they are relatively good at presenting their work and get good grades during presentation assessments. Students from government schools have relatively low communication skills. However, they are relatively good in written exams. Similar studies also are in agreement with this finding [20, 21].

The second factor identified is family income. Students' family wealth could affect their academic performance both positively and negatively. Most of the time, students with wealthy families are not active in class and have lower grades in test scores. However, students, who have economically poor families, have relatively good grades. This might be due to the student's motivation to change the life of their family by graduating with good grades. In line with this, family income is another factor that affects the academic performance of the students [22, 23].

The third factor identified is the student's self-motivation.

This might be related to the student's family income. The students might also be motivated to study hard, and actively engage in class due to other reasons including following the mentor's footsteps. Scholars also reported that student's self-motivation and having a good mentor can also affect the student's performance [24, 25].

The fifth factor identified is the teacher's delivery style. Students tend to actively engage in a class if they have been taught by a teacher, who is able to listen to the student's problems and teaches in a way that the students easily understand. Good teachers encourage students to participate in class and can significantly enhance the student's performance [26, 27].

The sixth factor identified is assessment. Students tend to give more attention to activities that have a higher assessment grade. This finding is in agreement with [28].

3.3. Effect of the Intervention (Action Taken)

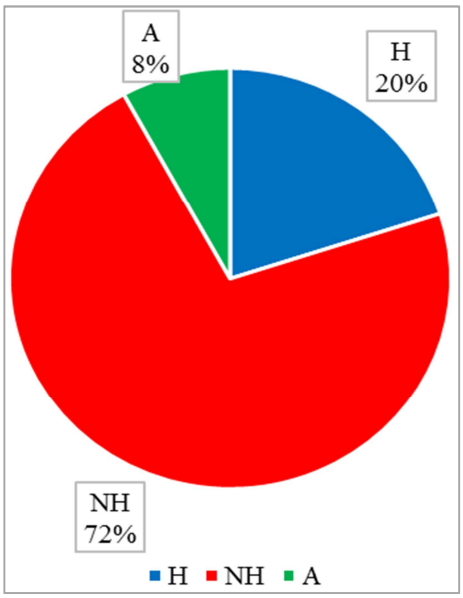


Figure 1. *Perception of the students about the intervention before it is applied.*

Where: H is the number of students, who are happy about the intervention and think that it will have an effect on improving their grades, NH is the number of students, who are unhappy about the intervention and think that it will not have an effect on improving their grade, and A is abstention.

In order to enhance the student's academic performance, an action or intervention was made. Before the intervention, an interview was conducted with students to assess their perception of the intervention. As depicted in Figure 1, five of the students (20%) are happy and thinks that it will have an effect on improving their grade. Eighteen of the students (72%) are not happy and they don't think that the intervention will have an effect on improving their grade. The remaining two students (8%) choose to be abstinent due to various reasons including they are neither happy nor unhappy about the intervention and they don't know its effect on their academic performance.

The reason for the larger number of students disagreeing with the implementation of the intervention might be related to their unwillingness to do intensive academic work during their time outside of the classroom. Coutts (2004) also reported similar finding [29].

After the student's perception was assessed through an interview, the intervention was made to enhance the student's academic performance. During lecture and tutorial hours, classwork was given to students regularly throughout the semester. The teacher regularly checked each student's academic performance and behavior on the way the students are doing their classwork, the attitude and motivation that they are showing while doing the classroom, etc. At the end of the class, the teacher will give the answer or solve the problem in the classroom so that students can crosscheck their answers and try to correct their mistakes if they made one.

Homework was also regularly given at the end of each class so that students will practice a non-face to face learning in the library, dormitory, or other places. This allows the students to work together in solving the problems given in the homework and this in turn can develop their teamwork skills. The teacher begins the class by checking whether the students do their homework. Then the teacher gave the answer or solves the problem in the classroom so that students can cross-check their answers. Then, the teacher will then continue the lecture and the cycle continues. It was mandatory for the student to do or at least try his/her best in solving the questions given in the form of classwork and homework in every class. The class works and home works were taken as a continuous assessment and marked out of 15%. The teacher always asks the students if there is any unclear thing in solving problems within the class works and homework. After applying the intervention for a month, the students were given two tests to check whether the intervention affects their test results positively. The test results of the students after the intervention are presented in Table 5.

Table 5. *Test results of the students after an intervention was made.*

Students	Number of students	Test scores					
		Test 1 (10%)			Test 2 (10%)		
		Average ± SD	Max	Min	Average ± SD	Max	Min
Male	19	7.73±1.04	10	6	6.89±1.28	10	5
Female	6	7.33±0.81	8	6	7.33±0.52	8	7
Total	25	7.60±1.04	10	6	7.00±1.15	10	5

As shown in Table 5, the students scored a better grade compared to the previous one. The statistical analysis of the student's grade after the intervention is presented in Table 6, Table 7, and Table 8. For all cases, there is no significant difference ($P>0.05$) between the two tests.

Table 6. *The statistical analysis of total student grades after the intervention.*

Total Students						
Groups	Count	Sum	Average	Variance		
Test 1	25	190	7.6	1.083333		
Test 2	25	175	7	1.333333		
ANOVA						
Source of Variation	SS	Df	MS	F	P-value	F crit
Between Groups	4.5	1	4.5	3.724138	0.059553	4.042652
Within Groups	58	48	1.208333			
Total	62.5	49				

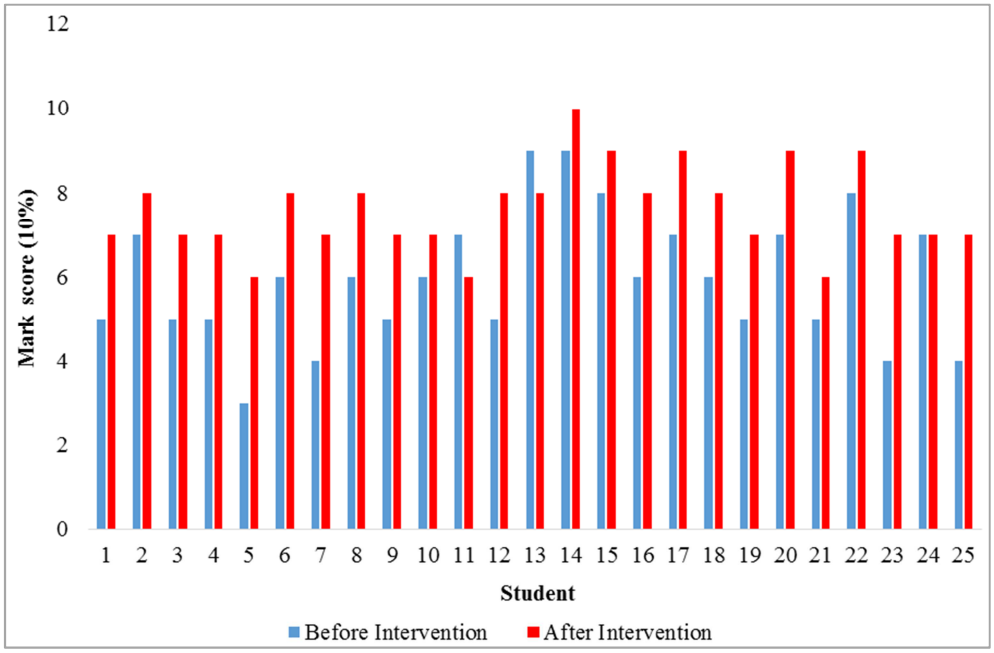
Table 7. *The statistical analysis of male student's grades after the intervention.*

Male Students						
Groups	Count	Sum	Average	Variance		
Test 1	19	147	7.736842	1.093567		
Test 2	19	131	6.894737	1.654971		
ANOVA						
Source of Variation	SS	Df	MS	F	P-value	F crit
Between Groups	6.736842	1	6.736842	4.902128	0.063244	4.113165
Within Groups	49.47368	36	1.374269			
Total	56.21053	37				

Table 8. *The statistical analysis of female student's grades after the intervention.*

Female Students						
Groups	Count	Sum	Average	Variance		
Test 1	6	44	7.333333	0.666667		
Test 2	6	44	7.333333	0.266667		
ANOVA						
Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	-8.9E-16	1	-8.9E-16	-1.9E-15	0.058345	4.964603
Within Groups	4.666667	10	0.466667			
Total	4.666667	11				

The test results of the students before and after the test are presented in Figure 2.



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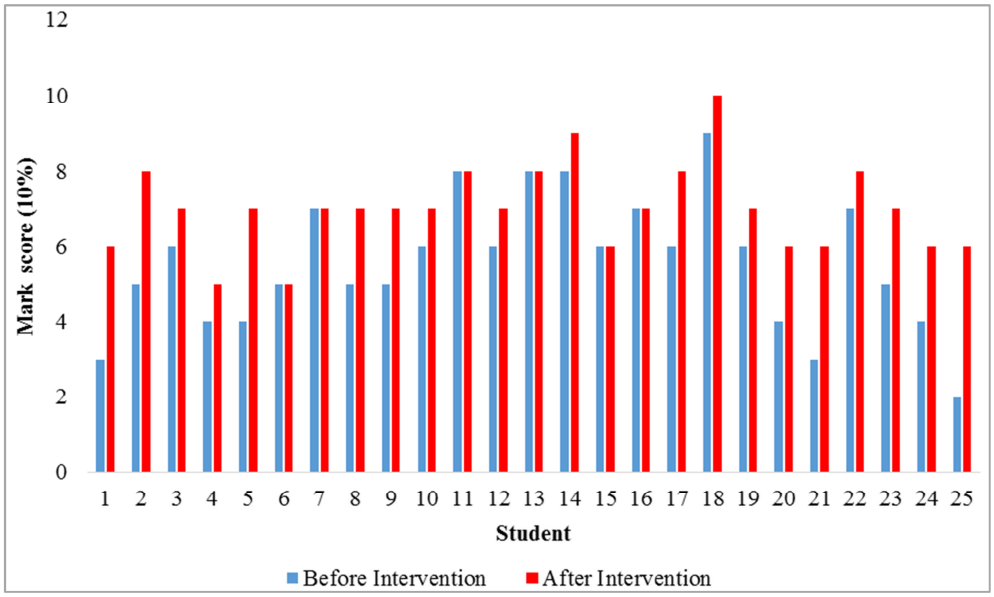

B

Figure 2. *Test 1 (A) and Test 2 (B) results of the students before and after the intervention.*

A statistical analysis is also conducted to check whether there is a significant difference between the two tests before and after the intervention is presented in Table 9 and Table 10.

Table 9. *The statistical analysis of total student's grades before and after intervention in Test 1.*

Test 1 (10%) Before and After Intervention						
Groups	Count	Sum	Average	Variance		
Before Intervention	25	149	5.96	2.456667		
After Intervention	25	190	7.6	1.083333		
ANOVA						
Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	33.62	1	33.62	18.99435	6.88E-05	4.042652
Within Groups	84.96	48	1.77			
Total	118.58	49				

Table 10. *The statistical analysis of total student's grades before and after intervention in Test 2.*

Test 2 (10%) Before and After Intervention						
Groups	Count	Sum	Average	Variance		
Before Intervention	25	139	5.56	3.09		
After Intervention	25	175	7	1.333333		
ANOVA						
Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	25.92	1	25.92	11.71967	0.001274	4.042652
Within Groups	106.16	48	2.211667			
Total	132.08	49				

As shown in Table 9 and Table 10, there is a statistical difference ($P<0.05$) between the test results before and after the application of the intervention in both tests. The test results of the students are also improved due to the intervention.

4. Conclusion

The current status of the students before the application of the intervention was assessed by taking the results of the two test scores. The maximum and minimum test scores of test 1 and test 2 were 9 & 3 and 9 & 2 respectively. Significant difference ($P<0.05$) was observed between the two test scores. From observation, it is noted that six factors are mainly affecting the students' performance. The perception of the students about the intervention was assessed using interviewing the students. Out of 25 students, 5 students were happy, 18 students were unhappy, and the remaining 2 students choose to be abstentious. The status of the students after the application of the intervention was also assessed. The maximum and minimum test scores of test 1 and test 2 were 10 & 6 and 10 & 5 respectively. The student's test

scores also indicate that there is no significant difference (P>0.05) between the two test scores. It can be concluded that the intervention significantly improves the student's test scores, which in turn improves their overall performance. However, further research has to be conducted at a large scale such as in 100 or above students. Moreover, other factors that affect the student's performance should be studied and other alternative interventions should be investigated for enhancing the student's academic performance.

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