

## Effects of Cooperative Learning on Cognitive Engagement and Task Achievement: A Study of Omani Bachelor of Education Program EFL Students

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### Abstract

Led by a premise that effective cooperative tasks play a vital role in enhancing Cognitive Engagement (CE) and task achievement in ESL/EFL teaching, this study investigates the effects of Cooperative Learning (CL) on Omani Bachelor of Education (B. Ed.) students' CE and task achievement. This quasi-experimental study has three objectives: (i) To find out the level of awareness of CE skills required during EFL learning sessions; (ii) To examine whether there are any statistically significant differences between the mean scores of students' responses taught through CL strategies and taught in normal setting; and (iii) To investigate whether there are significant differences among EFL students' CE levels attributed to their gender. A total of 36 B. Ed. students were assigned to Experimental Group and Control Group with 18 students in each. Analytical results of the study found that (a) The overall CE levels of the students was low at the mean score of 2.20; (b) On statistical grounds, significant differences were found at the level of  $<0.01$  between the mean scores of CE responses of students taught through CL and those who were taught in a normal setting; and (c) No statistically significant differences were found at the level of  $<0.05$  between mean scores of students' CE responses attributed to their gender. We have discussed a number of pedagogical implications emerging from the findings of this study for raising students' awareness, enhancing teachers' roles and responsibilities, effective task designing and developing engaging instructional materials.

**Keywords:** cognitive engagement, cooperative tasks, disengaged learners, effective teaching learning practices, interactive classroom experience, Omani EFL students, task achievement, task management

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## Introduction

The effective teaching-learning procedures and expected learning outcomes hinge on different pedagogical elements. These elements regulate how students develop their knowledge and skills through an interactive classroom experience that engages learners in the tasks management and tasks achievement processes. Similarly, classroom teaching and learning environment aims at activating learners' interest, introducing rich learning opportunities, and applying effective teaching and learning practices in order to ensure desired students' cognitive engagement. Previous studies such as Christenson, Reschly, & Wylie (2000); Skinner & Pitzer (2012) and Finn (1989) on CL and CE strongly suggest that disengaged learners generally slowdown in the learning process, become uninterested and inactive during teaching-learning opportunities, weaken their sustained attention and mental effort in attaining cognitive engagement and task performance, which results in failure to achieve the target knowledge and skills. In these researches, task engagement is considered as an important element that promotes active learning and it is also considered as a learning achievement requirement which impacts learners' academic behavior. Furthermore, an important research/finding on Teachers' Beliefs by Kindsvater, Willen, and Ishler (1988) claims that learning is more effective when it involves collaboration rather than competition.

Precisely speaking, cognitive engagement reflects the extent to which a learner perceives the need for learning in relation to future targets and goals, which is characterized by the students' engagement in the learning process. The paramount importance of cognitive engagement in the learning process leads researchers to examine the factors that help students engage cognitively while doing the tasks in pursuance and achievement of the target knowledge and skills. Therefore, researchers stress on the importance of investigating students' cognitive engagement as findings of such studies could uncover and suggest better ways and means of improving upon teaching and learning situations and achieve the target outcomes and results. Walker, Greene, & Mansell's (2006) study, conducted on 191 college students to uncover the predictors of cognitive engagement, confirmed that self-efficacy, intrinsic motivation, and academic identification each contributed uniquely to the prediction of meaningful cognitive engagement (p.1). Led by this and such other studies, the present study is conceptualized, framed, and conducted to examine how a planned instructional use of cooperative tasks can trigger and activate the cognition process of Omani EFL students and result in the desired cognitive engagement and task achievement. The study is conducted based on the following research questions.

## Research Questions

The main objective of this study is to examine and study the effects of the application of cooperative learning strategies on undergraduate Omani EFL B. Ed. students' cognitive engagement and task achievement. To achieve this objective, the following research questions are used.

- 1) To what extent undergraduate B. Ed. students are aware of cognitive engagement skills required for effective learning sessions?
- 2) Whether there are any statistically significant differences between mean scores of students' responses taught through cooperative learning strategies and those taught in a normal setting?
- 3) Whether there are any significant differences among undergraduate B. Ed. students' cognitive engagement levels attributed to their gender?

## Literature Review

To determine the research agenda, the following research studies on the chosen field of cooperative learning and cognitive engagement have been explored and examined to narrow down the focus, direction, and set the research agenda of the present study.

### *Cooperative Learning*

According to Sharan (2010) cooperative learning is about learning together in small groups which promotes value of learning to live together. It is also about the teacher's ways of using methods and strategies to help develop relationships among students and create a particular environment to maximize participation and engagement from all students in the group. All human identities, as Jenkins (2004) argued are social identities in a matter of meaning and meaning always involves interaction. Doughty & Pica's (1986) and Long & Porter's (1985) studies on language learning and interlanguage studies found that language used by the students in the actual processes of engaging with each other and also with the materials in the classrooms proves to be a significant factor in their language learning. Incidentally, 'Interlanguage' refers to the language produced by non-native speaking learners who are in the process of learning. The term '*Conversational Modification*', used by Doughty and Pica (1986), refers to various means by which learners *negotiate* meaning of input so as to make it comprehensible and personally meaningful. The inference here is that when learners are compelled to negotiate their own meaning, the very process of doing so is an aid to their language learning. This strongly supports the Vygotskian premise that knowledge is co-constructed in the learning process when individuals get engaged with one another through social interactions (Vygotsky, 1978).

The cooperative learning is a collaborative task between the learners and the teacher, in which teachers help learners to develop skills and competencies through the process of dynamic and active learning (Nasser, 2019). Many educators who implement CL strategies believe that teaching and learning should help their students to explore and discover the target knowledge. By re-conceptualizing the learning process in this context, learners will be in a better position to deal with the twenty-first century life challenges, where they will have enough skills and abilities to think critically and provide solutions rather than repeating the textual input (Rassekh, 2004). In this open global society, with the massive social-media exposure, teaching and learning process should be a discursive and interactive process that should go beyond the traditional teaching and information-transmission-based process. In this context, teachers need to facilitate the learning process and guide students to discover, evaluate, and apply in order to achieve the target skills and knowledge.

The review of Hall, et al's (1988) study suggests that cooperative learning is an alternative to teacher-fronted and top-down teaching approaches where students are expected to become active listeners, take notes during the class presentations, ask their group peers for clarifications, and complete peers' utterances. Cooperative learning differs from traditional learning as two or more participants are involved in it to learn the content together; they play equal role of a peer and the instructor's role is minimized; and, presumably, none of the learners are experts in the content to be learnt.

Helme and Clarke (2001) have developed a range of cognitive engagement indicators that reflect on cooperative tasks and activities which include exchanging ideas; completing peer

utterances; giving directions, information, and explanation; questioning; justifying an argument; making evaluative comments; and making relevant gestures and facial expressions.

Overall findings of Liao's doctoral study (2005) on the effects of CL showed a wide range of positive results on the use of learners' strategy, their motivation and a range of grammar achievement. The analytical results of the exploratory questions used in the study indicated that CL improved students' motivation and strategy use across all subgroups; However, those performing at higher and lower levels showed better improvements.

Johnson and Johnson's study (2018) on CL, as a strong motivational factor, suggests that learners' cooperative efforts result in a broad range of outcomes that could be placed into three broad categories of psychological adjustments; positive interpersonal relationships; and achievement efforts.

Van Ryzin, Mark, Roseth & Cary's (2021) study hypothesized that the increased social contact created by CL would facilitate greater peer relatedness, reduce student stress and thereby minimize emotional problems and facilitate academic engagement. The study concluded that, "cooperative learning can provide social, behavioral, academic, and mental health benefits for students" (p. 700).

Ferguson-Patrick's (2020) study emphasizes on CL as a culturally responsive inclusive approach to teaching which could be effectively exploited to support all students. This study found that, "Cooperative learning allows participants to develop a commitment to fairness, social responsibility and a concern for others." (p. 1). A conclusive finding of this study is that the teachers could manage to develop strong relationships, promote strong engagement, and encourage care in their classrooms. This study finds support from Kostoulas-Makrakis and Makrakis' (2020) premise that, "The most valuable thing we can offer our learners is genuine care, hope, happiness and love" (p. 178).

Costley's (2021) study, based on cognitive load theory, conducted on 1399 South Korean university students engaged in collaborative study groups in online classes found that "The amount of collaboration a student engaged in positively affected levels of germane load and that their level of contribution negatively moderated that relationship." (p. 1). Putting it differently, students who contribute less to the group have greater gains from higher levels of collaboration as compared to students who take a more active role in the group. Incidentally, cognitive load theory has three elements. Germane cognitive load is related to the mental effort applied to retain information and generate schemata of the target knowledge to learn. Extraneous load is about processing unnecessary information. And intrinsic load refers to the content complexity. Similarly, the study conducted by Pee, Kankanhalli & Kim (2010) found that students who make lesser contributions in group work have higher perceived levels of germane cognitive load as compared to the learners who make greater contribution.

### ***Cognitive Engagement***

According to Helme and Clarke (2001), CE is a process which involves sustained attention and mental effort along with self-regulation strategies. Astin (1984) explains student engagement as the amount of physical and psychological energy that the student puts in to the academic

experience in the classroom. Fredricks, Blumenfeld and Paris' (2004) definition of CE is related to the idea of "investment" which involves willingness and thoughtfulness to apply necessary efforts in understanding complex ideas in order to gain the mastery of difficult skills.

Earlier research in CE, for example of Craik and Lockhart's (1972), is based on the concept of the memory, which developed the idea of shallow or surface versus deep engagement in the context of textual proceeding of the literature. Anderson' and Rader's study (1979) on motivation and strategy use and Craik and Lockhart's study (1972) on levels of processing found that there are strong links between the type of processing and the memory. Graham and Golan (1991) studied motivation and CE through the application of depth of processing paradigm where they examined the relationship between variations in motivation with deep versus shallow processing. Greene' and Millers' (1996) study suggests that motivation variable is directly associated with CE which has a positive influence on the learning outcomes. According to Gedera, Williams, and Write (2015), motivation is counted as the most important contributor for student engagement and internal motivation. The study claims that motivated students tend to be more committed to and invested in learning.

Fredricks, Blumenfeld and Paris (2004) argue that engagement is a construct which is multidimensional and multifaceted, which includes cognitive, behavioral, and emotional components. These facets of human experience are considered important in Applied Linguistics research. According to Larsen-Freeman and Cameron (2008), these components are interdependent. In education literature these dimensions are found to be interdependent and overlapping constructs (Christenson, et al, 2012). Rivers (2000), emphasizes on the importance of CE in the process of language learning and language development based on the argument that students achieve ease in using a language when their attention is focused on receiving and conveying authentic messages; the messages which are of mutual importance and interest in a communicative situation. Additional studies have also indicated that CL positively affects learning at higher cognitive levels. Comprehensive analyses of Liao's (2005) doctoral study concluded that CL positively affected the students' learning at higher cognitive levels.

Sengsouliya, Soukhavong, Silavong, Sengsouliya, & Littlepage's (2020) study on the factors predicting high school's academic engagement found that, "Teacher and peer interaction are the most powerful factors predicting their academic engagement." (p. 124). The students of this study were found to be more engaged in learning when teachers provided opportunities to have discussion with peers. Lam and Muldner's (2017) study, conducted on manipulating CE in prepare-to-collaborate kind of tasks and the effect on learning proposes that a cognitively engaging preparation phase is likely to lead to better learning because it provides students encouragement to collaborate constructively.

### **Methods**

Further observation reveals that more studies are conducted on the university and college students focused on the investigation of motivational aspects such as beliefs, self-regulation, personal and environmental influences, etc. (Graham & Golan, 1991; Anderson & Reder, 1979; Bryan, Glynn & Kittleson, 2011; Husman & Lens, 1999; Dweck, 1986; Dweck & Leggett, 1988; Glynn, et al, 2011; Pintrich, 2004; Pintrich & De Groot, 1990; Ryan & Deci, 2000; Nolen, 2003). It is observed that, lesser number of studies are conducted on students' CL and CE in the context

of vital pedagogical issues and considerations (Herrmann, 2013; Azevedo, Moos, Johnson, & Chauncey (2010); Cleary & Zimmerman, 2012; Dinsmore & Alexzander, 2012; Entwistle & Entwistle, 1970; Ravindran, Greene, & DeBacer, 2005). Further observation indicates that most of these studies are conducted on students of Mathematics and Sciences; and studies conducted on the students of Humanities are somewhat limited.

After an extensive search of studies on CL and students' CE, no studies, conducted on education students, are found. Furthermore, it is observed that no study on CL and students' CE has been conducted in Omani context thus far, which has paved the scope for the present study.

### **Research Design and Methodology**

After establishing the research territory of the Interface between CL and CE, by reviewing previous researches, the researchers of this study identified a niche by examining the emerging gaps in the previous studies and decided to determine "Cooperative Learning and Cognitive Engagement in Omani Context" as a field of investigation of this study. Drawing desired focus and direction, this study aims to examine the Effects of CL on Students' CE and Task Achievement on year 1 undergraduate B. Ed. students of Dhofar University belonging to the academic year 2019-20. A quasi-experimental research design is used to measure the effects of the intervention on the experimental group. Data was collected using classroom observation checklist before and after the implementation of the intervention using descriptive procedures for analysis. In addition, a five-point Likert Scale quantitative questionnaire was administered on 120 students to investigate their level of awareness of cognitive engagement skills required during in-class learning sessions. Thus, the quantitative method of collecting and analyzing data is used to prove as to what extent CL enhanced CE of the target learners and the observation checklist data, before and after the intervention, is used to learn and find out if CL has been instrumental in enhancing the students' CL or not.

### **Participants**

The total population in this study is 156 undergraduate B. Ed. students. We have used "purposive sampling technique" as a non-probability sampling technique in which all the participants of the study share the same background characteristics (Crossman, 2020). The sample size for the current study equals the total population of the B. Ed. program undergraduate students studying in the Department of Education of Dhofar University. The questionnaire was distributed to 120 students to investigate their awareness of CE skills required for effective learning sessions. Remaining 36 students were assigned to two study groups. Group one was determined to be the experimental group consisting of eight female students and 12 male students. Group two consisting of seven female students and nine male students was considered to remain as control group. The students who participated in this study were in their second semester (Spring 2019-20), and all of them came from same educational background. Homogeneity and equivalency tests were conducted on the target sample of the experimental group to rule out the possibility of any major individual differences between the students which might affect the desired validity and reliability of the results of the study.

### ***Research Instruments***

In the current study, the researchers have used two research instruments, which are: (a) a quantitative questionnaire, and (b) a classroom observation checklist. The questionnaire consisting of 15 items was administered on 120 students to investigate their awareness of CE skills required for effective learning in the class sessions. In addition, a classroom observation checklist was used to measure the effects of applying the strategies of CL on the students' CE. This research tool allowed the researchers to find out students' differences related to the application of CL strategies required for effective learning. The observation checklist was adapted based on the early work of Nolen, 1988; Nolen and Haladyna, 1990a, 1990b; Greene and Miller, 1996; and Miller, et al, 1996. The fifteen items in the questionnaire of the current study were conducted using a five-point Likert scale to measure the effects of CL on students' CE.

### ***Reliability and Validity of Research Instruments***

The researchers have used Cronbach's alpha measurement to ascertain the reliability coefficient required of each item of the questionnaire in the pilot study. The Cronbach's alpha coefficient was 0.821, which is an appropriate coefficient as a minimum representative benchmark, according to Hair, et al., 1995, i.e., between 0.60 and 0.70.

Content validity, according to Fraenkel and Wallen (2000), is another important indicator of instrument validation which has been achieved by getting the observation checklist reviewed by experienced and competent faculty members who are familiar with the content knowledge of the course taught to the two groups. This observation checklist was reviewed by seven competent faculty members from the Department of Education and Department of English Language and Literature of Dhofar University to ensure the maximum validity of the instrument. The checklist was subjected to required modifications based on the feedback received from the seven reviewers. Before conducting classroom observations, the researchers had two trials of classroom observation of the students other than the two groups of the current study which was followed by detailed discussions to improve upon the ambiguous items in the checklist. After this, the researchers examined the checklist for its inter-rater reliability. The inter-rater reliability coefficient was  $r = .90$ , which suggests that the collected data and the scores are reliable.

In this study, the researchers have conducted Exploratory Factor Analysis to ensure required validity of the questionnaire to be answered by 90 neutral undergraduate students other than the students included in the sample of the real (experimental) study. These pilot study students belonged to College of Arts and Applied Sciences of Dhofar University. The completed questionnaires were analyzed using the SPSS 11.0 version. Applying the Principal Component Method, Factor Analysis has been conducted by the researchers to ensure a higher construct validity of the questionnaire. The Kaiser-Meyer-Olkin (KMO) value was found at 0.72, which is more than 0.5, which establishes the appropriateness of the sample size. In addition, Bartlett's Test of Sphericity value was 0.001, which is at the significant level of (0.01), which clearly indicates that at least two items are correlated. After the application of the Varimax Rotation method on the 15 items, three factors needed to be revised based on the results that emerged from the Factor Analysis. In addition, the

ethical considerations and required measures involved in this data-driven scientific research were duly followed and adhered to.

### ***Homogeneity and Equivalency Test***

For testing the level of homogeneity and the equivalency of the two groups before the actual intervention period, the participants' English Language Achievement Score (ELAS) at the Foundation Program Level and their total grade point average (TGPA) at their Higher Secondary School Examination level were analyzed using t-test to find out the differences of the afore-mentioned external variables between the two groups.

Table one below shows the differences of the significance level between the two groups of participants related to the two external variables.

Table 1. *Significance of differences between the two groups related to the external variables*

External Variables	Control Group N=18		Experimental Group N=18		t-value	Sig.
	Mean	Std. Dev.	Mean	Std. Dev.		
<b>ELAS</b>	78.30	9.65	78.73	9.89	- 0.03	0.98
<b>TGPA</b>	71.78	66.34	71.73	60.81	0.18	0.86

Table one above highlights the significance of differences related to the external variables for the control group and the experimental group. The t values of ELAS  $t = -0.03$  and TGPA  $t = 0.18$  are both below the level of significance which suggests that there were no statistically significant differences between the mean scores of the experimental group and the control group. The mean score of the ELAS test is at 78.30 for the control group and 78.73 for the experimental group with the standard deviations of 9.65 and 9.89 respectively. Similarly, the TGPA of the control group was 71.78 and of the experimental group 71.73 with the standard deviations of 66.34 and 60.81 respectively. This shows that, prior to the beginning of the experimental intervention, the two groups were equal in relation to above-mentioned test scores.

### ***The Intervention***

The participants in the control group and the experimental group were made to use and study the same course syllabus and teaching-learning materials prescribed by the University. The students regularly met twice a week and studied with the teacher for fifteen weeks in a class session of one hour and 15 minutes each. The control group was taught using the normal lecturing mode; whereas, the experimental group was taught in the framework of CL and CE. In this framework the teachers are subjected to plan and organize interactive tasks and activities that are suitable to activate the process of interaction and elaborate and sustain students' engagement throughout the lesson.

Preceding discussion of research design and methodology, used in this study, leads to the presentation of the data and discussion of results, which is presented in the following section. This data has been presented separately for each research question of the study.

### **Findings**

***Data and results related to RQ1:*** To what extent B. Ed. Students are aware of cognitive engagement strategies required for effective learning sessions?



The following table contains data and results related to CE levels of students.

Table 2. *Levels of students' CE (N=120)*

No.	Items	Weighted mean	Standard Deviation	CE Level
Category 1: General interaction with the teacher			0.82	Low
1	Teacher introduces the topic of the task.	2.03	1.13	Low
2	Teacher explains the context of the target topic.	2.24	1.28	Low
3	Students interact with the teacher for further clarifications.	2.10	1.16	Low
4	Students understand their roles and responsibilities to process the task.	2.23	1.25	Low
5	Students take notes while listening to the teacher.	2.08	1.08	Low
	<b>Total</b>	<b>2.35</b>		
Category 2: Engaging in class discussion			0.76	Low
6	Students ask their peers in the group for further clarifications.	2.26	1.23	Low
7	Students use their notes to process the task.	2.23	1.16	Low
8	Students exchange their ideas between group members.	2.20	1.28	Low
9	Students complete peer utterances.	1.90	1.09	Low
10	Students justify their arguments.	1.96	1.12	Low
	<b>Total</b>	<b>2.14</b>		
Category 3: Engaging in group discussion			0.75	Low
11	Students make gestures while listening to discussions.	2.10	1.13	Low
12	Students make evaluative comments.	2.45	1.28	Low
13	Students give directions during discussion.	2.43	1.25	Low
14	Students give further explanations.	2.36	1.21	Low
15	Students are focused and active listeners.	2.40	1.23	Low
	<b>Total</b>	<b>2.11</b>		
<b>Overall Cognitive Engagement</b>		<b>2.20</b>	<b>0.64</b>	<b>Low</b>

The above table represents the levels of students' cognitive engagement related to the results of the questionnaire distributed prior to the experimental stage. The weighted mean, standard deviation, and cognitive engagement level are shown in this table. As can be seen in the above table, the overall mean score of EFL students' CE level was 2.20 with a standard deviation of 0.64, which is counted as low level. The total mean score of the three categories of CE Level ranged between 2.11 to 2.35 with a standard deviation ranging between 0.75 to 0.82, which reflects a low level of students' cognitive engagement. The narrow range of the mean scores and standard deviations in the three domains indicate that the study sample, in approximate terms, is a homogenous group in view of the low level of students' awareness of cognitive engagement skills and related strategies.

**Data and results related to RQ2 at the pre-intervention stage:** Whether there are any statistically significant differences between the mean scores of students' responses taught through cooperative learning strategies and those taught in a normal setting?

The following table shows the data and results related to the significance of differences between mean scores of students' responses taught through CL strategies and those taught in a normal setting at the pre-intervention stage.

Table 3. *Significance of differences in CEL between the two groups in the pre-intervention Stage*

Categories	Control group (N=18)		Experimental group (N=18)		t-value	Sig.
	Mean	Std. Dev.	Mean	Std. Dev.		
General interaction with the teacher	2.13	0.82	1.84	0.68	1.15	0.26
Engaging in class discussion	2.12	0.68	2.39	0.93	-0.98	0.33
Engaging in group discussion	1.79	0.65	1.73	0.66	0.25	0.80
Total Cognitive Engagement	2.01	0.59	1.99	0.60	0.13	0.89

The table above shows the statistics relevant to the results of pre-intervention stage collected through the classroom observation checklist for both the control group and experimental group. The results of t-test and its t-value and significance value are also highlighted. As evident, the total mean of the control group in the three categories of CE is 2.01 with the standard deviation of 0.59, and the total mean of experimental group in the three categories of CE is 1.99 with the standard deviation of 0.60. This result, at the level of  $<0.05$  between mean scores of B. Ed. students' CE responses who were taught through CL and those taught in a normal setting, suggests that there are no statistically significant differences between the participants of the two groups.

**Data and results related to RQ2 at the post-intervention stage:** Whether there are any statistically significant differences between mean scores of students' responses taught through cooperative learning strategies and those taught in a normal setting?

The following table shows the data and results related to the significance of differences in CEL between the two groups in the post-intervention stage.

Table 4. *Significance of differences in cognitive engagement scores between the two groups in the post-intervention stage*

Categories	Control group (N= 18)		Experimental group (N= 18)		t-value	Sig.
	Mean	Std. Dev.	Mean	Std. Dev.		
General interaction with the teacher	2.61	0.82	4.3	0.28	-8.32	<0.001
Engaging in class discussion	2.61	0.88	4.27	0.38	-7.36	<0.001
Engaging in group discussion	2.52	0.78	4.18	0.35	-8.20	<0.001

Total Cognitive Engagement	2.58	0.73	4.25	0.15	-9.48	<0.001
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The above table shows the results of post-intervention stage data collected through classroom observation checklist for both the control group and experimental group. The results of t-test in terms of t-value and significance value are also included. As evident, the total mean of the control group in the three categories of CE is 2.58 with a standard deviation of 0.73, and the total mean of experimental group in the three categories of CE is 4.25 with a standard deviation of 0.15. This result suggests that there are statistically significant differences at the level of <0.01 between mean scores of B. Ed. students' CE responses who were taught through CL and those taught in a normal setting. Evidently, the mean score of the experimental group has almost doubled (4.25) as compared to the control group's score (2.58) at the end of the intervention stage as a result of significant development and growth of students' cognitive skills and competence.

**Data and results related to RQ3:** Whether there are any significant differences among undergraduate B. Ed. students' CE levels attributed to their gender?

The following table shows the data and results related to the significance of differences in CE responses between the students in the experimental group in the post-intervention stage attributed to their gender.

**Table 5. Significance of differences in cognitive engagement scores between students in the experimental group in the Post-Intervention Stage attributed to their gender**

Categories	Male (N= 7)		Female (N= 11)		t-value	Sig.
	Mean	Std. Dev.	Mean	Std. Dev.		
General interaction with the teacher	4.22	0.31	4.35	0.25	-0.87	0.40
Engaging in class discussion	4.37	0.37	4.20	0.38	0.94	0.36
Engaging in group discussion	4.11	0.40	4.22	0.33	-0.60	0.55
Total cognitive Engagement	4.24	0.17	4.25	0.15	0.49	0.83

The table above shows the post-intervention stage statistical results generated from the data collected from classroom observation checklist for students in the experimental group attributed to their gender. The results of t-test are also highlighted in terms of t-value and significance value. As evident, the total mean of the male group in the three categories of CE is 4.24 with a standard deviation of 0.17, and the total mean score of the female group in the three categories of CE is 4.25 with a standard deviation of 0.15. This result indicates that there is no statistically significant difference at the level of <0.05 between mean scores of male and female B. Ed. students' CE responses in the post-intervention stage. It is obvious from the above results that the participation and engagement of both male and female students during the intervention stage was almost the same, and also the effects and intended outcomes of the intervention program were also almost the same. This result is a clear indicator that the intervention plan, procedures followed, tasks and activities involved, and their implementation over a period of one semester delivered desired effective results.

## Discussion of Results

The results of the pre-intervention questionnaire, administered on the total sample size of 120 students, in response to RQ1, suggest that the students' awareness of CL and CE strategies were at a considerably low level. This result also corresponds with the pre-observation phase checklist results of both study groups which was also at a low level. In the beginning of the intervention phase, the experimental group students were reluctant and were not being able to use the CL and CE strategies effectively while attempting the target group tasks. However, in response to RQ2 related to the intervention during the initial phase of the study, the students' awareness of CL strategies and their role in the effective learning were raised, which includes note taking, exchanging ideas, asking for clarifications, developing interactive arguments, and justifying arguments between group members. This exercise enhanced their level of enthusiasm and participation in the group tasks, which is reflective of Greene and millers' (1996) finding that motivation variable is directly associated with CE, which has a positive influence and effect on the learning outcomes. Based on the social-constructivist approach adopted with the experimental group, the students started gradually developing, using, and internalizing relevant strategies of CL and CE, which is consistent with the results of Liao's (2005) doctoral study and Panday's (2017) research on the effects of CL on the students' CE. Other supporting research studies include Liao's study, which establishes the fact that CL promoted and strengthened the experimental group learners' use of the learning strategies than those in the whole-class group and Pandya's (2017) study shows a significant growth in the students' ability to build up deep thinking in terms of using CL and CE strategies, which corresponds favorably with the skills and strategies developed by the participants of the current study. On the other hand, the same result of the current study is in partial disagreement with Herrmann's (2013) quasi-experimental study, which concluded that CL only enhanced the level of activeness and did not increase the level of knowledge engagement significantly.

In line with Johnson' and Johnson's (2018) argument, the researchers of this study, based on the positive results of RQ2, are of the view that thinking can be adjusted and applied through various techniques at different stages of comprehension in order to raise the level of CE based on the positive results of the study. This is due to the fact, as argued by Johnson and Johnson (2018), that there are useful cognitive activities and effective interpersonal dynamics that can only materialize into fruitful results when students promote each other's learning, as happened in the CE achievements of the participants of this study, which confirms Jenkin's (2004) argument that all human identities are social identities in a manner of meaning and meaning always involves interaction. The results of RQ 2 of this study also support the Vygotskian premise (1978) that knowledge is collaboratively constructed through social interactions when individuals are engaged with one another in the learning process. The significant results relevant to RQ 2, achieved by the participants of this study, also find support from and lend confirmation to the findings of Costley's (2021) study, which claimed that the degree of collaboration that a student engages with positively affects the germane load, which refers to mental effort that a student devotes to retaining information and generating schemata of the target knowledge to be acquired.

Another outcome of this study, related to RQ 3 on gender differences, suggests that no statistically significant differences were found at the level  $<0.05$  between mean scores of students' CE from the post-classroom observation checklist results. A comparative perspective of

research findings on gender differences suggest that in Sani and Hashim's (2016) study on school students from grades 7-11, male students demonstrated deep engagement whereas female students, comparatively, showed shallow engagement. Whereas, Pagar's (2016) study, conducted on the same age group of students, indicates that the female students' engagement turned out to be slightly higher than the male students. However, the current study found no significant differences between the male and the female students. This finding could be linked with the maturity of age, university study culture, and spirit and willingness of task completion with the sense of equal responsibility and more so being B. Ed. students, the participants in the experimental group of this study, seem to have comparatively higher motivational drive than the students from other majors as they are targeting to take up more responsible teaching career in future.

### **Conclusion**

This study has examined (i) the extent to which B. Ed. undergraduate students are aware of CE skills required for effective learning sessions related to (RQ1); (ii) whether there are any significant differences between the students' cognitive skills achievement in the experimental group and control group relevant to (RQ2); and (iii) whether there are any gender-based differences on students' CE achievements, related to (RQ3).

The findings of the data results related to RQ1 of the study suggested that the overall level of students' CE skills awareness was at 2.20, which is counted as a low level of awareness. The findings of the data results relevant to RQ2 confirm that significant differences were evident in the cognitive skills achievement of students in the experimental group and control group. Post-intervention results showed that the cumulative score of CE achievement for the experimental group was at 4.25 as compared to the achievement of the control group staying lower at 2.58. Evidently, the experimental group's achievement is almost double in comparison to the control group as a result of systematically planned and implemented intervention. However, the findings of the data results for RQ 3 did not show any significant differences in the participants' cognitive achievement of the experimental group based on gender lines.

### **Implications of the Findings and Limitations**

Thus, the findings of the current study, by way of its pedagogical implications, establish a strong argument in favor of a paradigm shift from normal lecture-based classroom teaching method to a more dialogic and discursive teaching-learning approach in a social constructivist framework in order for students to engage in deeper stimulating learning processes and experiences. More specific implications of the findings certainly emerge for the teachers, students, materials designers and policy makers. The teachers need to plan their lessons in an integrated and interactive frame, design and exploit creative and innovative problem-based tasks and activities to engage the learners, and to promote higher order critical thinking in the classrooms. Students need to frequently avail opportunities of interaction and discussion in the classroom. Policy makers in the institutions need to provide teachers with a considerable degree of autonomy to explore, create, and use authentic materials along with the prescribed text book(s) in order to maximize active learning and ensure effective CE of the learners.

In terms of the limitations of this study and more focused scope for further research, the need to investigate CE of the learners in relation to specific aspects of language learning such as

academic writing, reading, speaking, and listening could be undertaken. CE studies can also be conducted in relation to and also in contrast with a certain methodology of teaching such as “students’ cognitive engagement through communicative language teaching method or through task-based method of teaching” or contrastive studies such as “students’ cognitive engagement through grammar translation method of teaching versus cognitive engagement through task-based method of teaching”. CE can also be investigated in product-based approach to teaching language skills in contrast with process-based approach to teaching language skills. Furthermore, investigations on group work and how the dynamics of the group change over a period of time will deepen more focused understanding of student-to-student interactions and their contributions can also be a fertile are of research.

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