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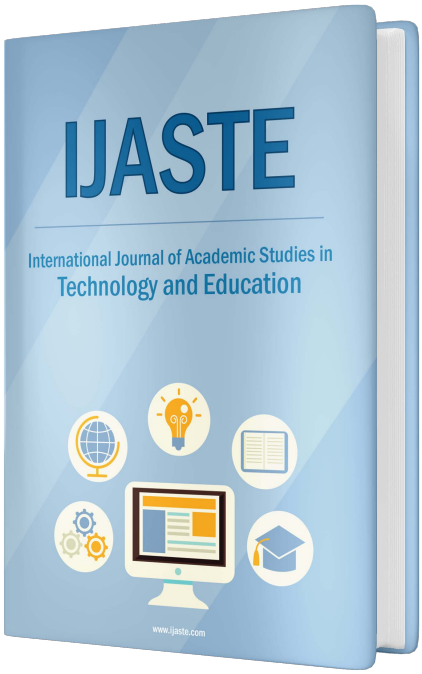

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About the Journal

The International Journal of Academic Studies in Technology and Education (IJASTE) is a peer-reviewed scholarly online journal. The IJASTE is published quarterly in Winter and Summer. The IJASTE is published biannual as an international scholarly, peer-reviewed online journal. There is no publication fee in the IJASTE. The IJASTE is an international journal and welcomes any research papers on education and technology using techniques from and applications in any technical knowledge domain: original theoretical works, literature reviews, research reports, social issues, psychological issues, curricula, learning environments, book reviews, and review articles. The articles should be original, unpublished, and not in consideration for publication elsewhere at the time of submission to the IJASTE.

Submissions

All submissions should be in electronic (.Doc or .Docx) format. Submissions in PDF and other non-editable formats are not acceptable. Papers are accepted only in English. Manuscripts can be submitted through the journal website (https://www.ijaste.com). All manuscripts should use the latest APA 7 style. The manuscript template for formatting is available on the journal website.

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From Editor

IJASTE, the International Journal of Academic Studies in Technology and Education, is pleased to be able to provide valuable research to its valued readers in its first issue. We have included the works of eminent researchers from a wide and diverse geographical area. The articles in this issue are written by researchers from the United States, Turkiye, Bangladesh, and Ghana.

The topics covered in this issue range from conservation studies, educational strategies and thinking skills, distance education, and language-literature relations. Conclusions and recommendations in the articles will inspire scholarship and literature and guide future research.

We are grateful to all the editorial teams and authors for their contribution to this issue.

Dr. Mustafa Tevfik Hebebci
Editor in Chief

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Coloring for Conservation: Outreach Science for Eastern Hellbender Salamanders

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Abstract

Engaging K-5 future citizen scientists is a challenge which balances effective outreach science and curriculum development, as well as in and out-of-classroom experiences. Environmental education programs should be designed to both engage and inform the public on important conservation issues related to local biodiversity. Amphibians, especially salamanders, are experiencing worldwide declines, but are relatively overlooked by the public when compared with frogs and other more charismatic species. To this end, we developed a hellbender-focused, outreach-education coloring book, which was provided to either stream visitors as part of ongoing education programming or in classroom/summer camp settings, in two states where eastern hellbender salamanders occur. We assessed whether this coloring book activity engaged and informed K-5 level participants by performing a short, post-implementation survey. Results indicate that the hellbender coloring book was effective as an educational tool and provided an engaging experience for participants, while concomitantly teaching that moving rocks within streams can be potentially harmful for aquatic organisms, including larval hellbenders. We recommend conservation managers from state and federal agencies work closely with community educators to implement similar programs to inform the local general public on environmental programs using conservation themed coloring books.

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Introduction

Environmental education (EE) programs should be designed to raise awareness about conservation issues, incorporate strategies for conservation outcomes (Hughes, 2012), and actively engage participants to be effective stewards for conservation (Duvall & Zint, 2007). The more educational tools environmental educators and science teachers implement in their activities, the more likely their efforts will result in successfully informing students and the general public about conservation issues (Breuer & Mavinga, 2009; Strickland et al., 2021). Visual narratives, including comics, animations, and coloring books, have increasingly become utilized for science education to a wide audience across age groups and cultural backgrounds (Farinella, 2018). Comics, or visual graphic stories, provide a potential valuable tool to concomitantly engage, inform, promote scientific literacy, and communicate science education (Rota & Izquierdo, 2003; Tatalovic, 2009; Kachorsky & Reid, 2022). Similar to comics, coloring books can also be developed which allow EE programs utilizing this visual media form to reach wide, diverse, and younger audiences regarding conservation.

Educated-themed coloring/comic books that graphically present information using a narrative format of minimal text juxtaposed with visual images have been used in both formal and informal education settings for teaching a variety of scientific topics (Warinner & Hendy, 2017; Morel et al., 2019). This type of easily disseminated media can lead to discussion of scientific theories (Cheesman, 2006), shape attitudes of non-majors towards evolutionary scientific concepts (Hosler & Boomer, 2011), and increase student attitudes toward conservation (Sukri et al., 2020). Coloring and comic books have also been used to teach technically challenging subjects such as medical health (Spiegel et al., 2013; Inaoka et al., 2022) and science technology (Lin et al., 2015). Science and environmental educators have implemented the use of coloring books to promote species awareness for insects (Knowlton et al., 2019), invasive species (Maggiuli, 2022), freshwater fish (Loury et al., 2021), and environmental pollution (Mitchell et al., 1992; Baga et al., 2022) and local biodiversity knowledge (McGuire et al., 2009). Moreover, comics have been utilized for informing the general public on environmental issues, including water use (Hihara, 2016). However, there has been relatively little regarding research on the use of comics to teach science at the elementary grade level (Pantaleo, 2021). This may be due to lack of availability of discipline specific materials, i.e., scientific content in popular comics or manga (Septaria & Fatharani, 2022). Therefore, further work is needed to investigate the potential for visual graphic

based environmental education opportunities to inform the general public, including younger audiences, about species of conservation concern.

Amphibians are currently facing declines worldwide (Beebee & Griffiths, 2005). Salamanders are an important and often overlooked group of amphibians which provide ecosystem services, yet many salamanders are experiencing population declines (Wheeler et al., 2003; Rovito et al., 2009). Outreach-education programs involving amphibians highlight the need for biodiversity-based programs to focus on a small number of species starting in primary school (Randler et al., 2005) and the need for programs to use a hands-on, pedagogical approach when developing activities for amphibian conservation to positively change attitudes (Sousa et al., 2016). Education activities which include hands-on approaches can help improve student attitudes and perceptions of native herpetofauna in elementary schools (Toenjes, 2018).

Hellbenders are large, fully aquatic salamanders found in cool flowing streams (Petranka, 1998). They include two recognized subspecies, the Eastern Hellbender, *Cryptobranchus alleganiensis*, found across the eastern and middle United States, and the Ozark Hellbender, *Cryptobranchus alleganiensis bishopi*, a federally endangered subspecies only found in Missouri and Arkansas. Population declines for both have been documented throughout their range (Wheeler et al., 2003; Burgmeier et al. 2011). Presently, direct conservation management activities include captive husbandry (Ettling et al., 2013) and reintroductions (Bodinof et al., 2012; Burgmeier et al., 2022), both of which may increase instream populations and offset dramatic declines. Previous published research on eastern hellbender education has focused on either developing zoo exhibits (Rollins & Watson, 2017) or using the hellbender as a case study in conservation genetics, with an emphasis on the high school level (Chudyk et al., 2014). However, many K-12 grade level students are both curious about amphibians and reptiles, yet also have many misconceptions or myths about amphibians and reptiles (Tomasek et al., 2005). Previous research highlighted that increased familiarity with hellbender salamanders, led to more positive attitudes toward this unique salamander by the general public (Mullendore et al., 2014). Interestingly, presenting cartoon images compared to photographs of hellbenders has been found to elicit a more positive response (Osinki et al., 2019), indicating the potential for hellbender coloring books to appeal to a wide audience. Developing hellbender-focused outreach programs targeting the general public is crucial for ensuring an understanding of the species and future conservation success, potentially eliciting buy in for conservation efforts of the species.

To address the potential for science outreach to effectively target a younger audience, students and recreationalist on hellbender conservation, we developed a coloring book to present the natural history and conservation issues for this enigmatic aquatic species. This study focuses on a potentially transformative and engaging activity, developing and implementing a concise activity at the K-5 level, whereby future citizen

scientists participate in coloring for conservation and learn about a unique North American salamander, the Eastern Hellbender. Specifically, we report on participant feedback of whether this activity was informative, fun, and if participants learned that moving rocks in streams can negatively impact these salamanders, which is a potential threat to the species (Unger et al., 2017; Unger et al., 2020). We further explore the impact outreach environmental education (O&E) can impart when utilized to inform the public. Finally, we discuss our findings in the context of how similar programing can be developed for amphibian conservation at broad, as well as for other local or federally imperiled species.

Method

Development and Deployment of Coloring Books

A coloring book was developed for outreach education to promote conservation and to inform the general public (Figure 1; Figure 2). The coloring book was aimed at a younger audience, ages 5-12, with the main goals of providing a fun, yet informative method for learning about what hellbender salamanders are, some of their natural history and biology, where they are typically found, and why moving rocks is a potential threat to their stream habitat. The coloring book included a maze (www.mazegenerator.net) and a QR code (generated by www.qr-code-generator.com), which linked to a newly developed website on hellbender conservation, (www.helpthehellbender.com). This project was conducted as a partnership between federal and state agencies, universities, and schools from two areas within the range of the species. Comic book available here: https://ag.purdue.edu/department/extension/hellbender/teachers.html. It followed ethical guidelines from the Wingate University Research Review Board.

Figure 1. Selected Images (*pages*) of Coloring Book Given to K-5 Participants

Outreach education events were identified to target this K-5 audience in Indiana and North Carolina, two states with active hellbender management programs. Declines have been noted in Indiana, whereas North Carolina is thought to include many stable populations. In Indiana, coloring books were deployed in an elementary school grade 3 (W.E. Wilson Elementary School, Jeffersonville, Indiana) on 9/30/22, where as in North Carolina coloring books were deployed as part of summer camp (range of camp participant ages 4-8, 11-15, 8-12 & 7-13) at Rob Wallace Park and Frank Liske Park, located in Midland, Cabarrus County, North Carolina. Coloring books were also deployed as part of the Pisgah River Rangers program in Pisgah Forest, where outreach events aimed at the general public (National Forest visitors/ participant ages 5-10) were performed in a location where hellbenders are commonly found on site in a tributary of the French Broad River, near Brevard, North Carolina.

Figure 2. Additional Images (*Pages*) of Coloring Book Given to K-5 Participants

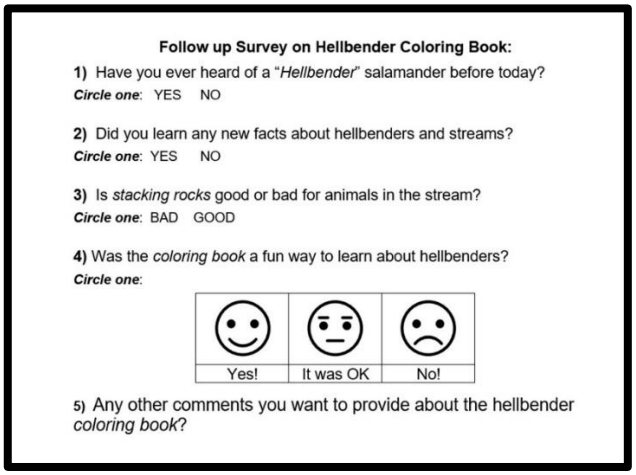

Figure 3. Follow-up Survey Following Hellbender Coloring Book Activity

For each event, coloring books were passed out, and participants were instructed to color for ~10 to 15 minutes while they read through the book. Crayons were distributed with coloring books. Immediately following this, a short post-implementation survey with several questions was given to the participants (Figure 3), as time precluded doing pre-implementation surveying. The survey was followed by a reflection discussion (led by educators and including participants) on the importance of hellbender salamanders to the river ecosystem and the problem of moving rocks and how it can impact the conservation of this species. When doing group outreach events, the post-implementation survey was conducted by a show of hands for all questions. As part of the Pisgah River Range program, an additional question included home town/state, to ascertain where the National Forest visitors were from (i.e., home state, etc.), as many visitors to the recreational area are likely from out of town.

Data Collection and Analysis

Data collected from participants was compiled, following Wingate University Research Review Board standard protocols for keeping names and data anonymous. We summarized participant survey data in Microsoft® Excel® and calculated percent responses for each survey question, **Q1**-**Q4** (Figure 3). We ran a Chi-squared analysis on responses with a significance level of 0.05. We primarily present descriptive statistics for all questions and include feedback responses (written reflections) from participants for responses from **Q5**.

Results

Perspectives from Youth Participants

We collected responses from 163 total study participants. Across all outreach events using the comic book, responses for **Q1**: "*Have you ever heard of a salamander before today?*", 40.5% responded YES, with 59.5% responding NO. For **Q2**: "*Did you learn any new facts about hellbenders and streams?*", 92% responded YES, with only 8% responding NO. For **Q3**: "*Is stacking rocks good or bad for animals in the streams?",* 97.5% responded BAD, with only 2.5% responding as GOOD. Lastly for **Q4**: "Was the coloring book a fun way to learn about hellbenders?", 88.3% responded YES, 8% responded OK, and only 3.7% responded NO (Table 1; Figure 4). Results for analysis of survey questions were variable, with Chi-squared analysis for **Q1** being non-significant, X^2 (1, N = 163) = 3.168, p = 0.075. Responses for **Q2** were significant, X^2 (1, N = 163) = 69.123, $p < 0.001$. **Q3** responses were also significant, X^2 (1, N = 163) = 94.355, $p < 0.001$, and for **Q4**, responses were also significant, X^2 (1, N = 163) = 103.294, $p < 0.001$.

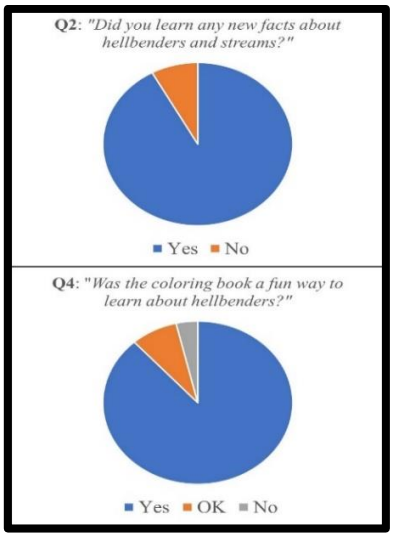

Figure 4. Pie Charts of **Q2** and **Q4**.

Example comments given by participants include a range of primarily positive feedback including "*I learned that stacking rocks is bad,*" "*I liked learning that the males guard eggs under large rocks,*" "*Great illustrations and I love how interactive the coloring book is while I learn,*" and "*I can't wait to use it more and keep coloring*" (Table 1). One comment included a suggestion for improving the coloring book, mentioning "*Beautifully illustrated, factual, would suggest including illustration to show a map.*" Another participant commented, "*You could maybe add a life cycle picture and more details or information.*" Therefore, written comments given by participants largely mirrored responses to **Q4**.

Table 1**.** Responses of Participants, $N = 163$

Survey Questions	Participant Responses
Q1) Have you ever heard of a "*Hellbender*" salamander before today?	40.5% YES: 59.5% NO
Q2) Did you learn any new facts about hellbenders and streams?	92% YES: 8% NO
Q3) Is *stacking rocks* good or bad for animals in the stream?	97.5% BAD: 2.5% GOOD
Q4) Was the *coloring book* a fun way to learn about hellbenders?	88.3% YES: 8% OK: 3.7% NO
Q5) Representative Comments	*"Fun, cool, pretty drawings, something to do when I get back to my campsite"* *"Activity was cute"* *"Can't wait to use it more and keep coloring!"* *"Excited and will use it on the way home"* *"Great Illustrations, I love how interactive the coloring book is while I learn"* *"Well done, love it"* *Beautifully illustrated, factual"* *"I learned that stacking rocks is bad"* *"I liked learning that the males guard eggs under large rocks"* *"I liked the maze and coloring book"*

Discussion

The primary results of our study indicate that designing and deploying graphic media aimed at a younger, general, citizen science audience can be both well received and serve as a valuable tool for conservation education, especially for amphibians, many of which are facing declines. We received largely positive feedback on coloring books that were distributed, which in the short-term, appear to provide an avenue for O & E to teach conservation. When taken together, the positive comments and participant responses tell a story of implementing a fun activity that can link together future citizen scientists to learn about important conservation issues related to hellbenders in streams. We recommend this coloring book be handed out at events where hellbenders occur as part of environmental festivals and also elementary schools. Non-traditional forms of literature in the classrooms, such as comics and coloring books, can be successfully implemented into classroom instruction on science using standard question and answer, reading out loud, reflection, and even having students draw their own comics (Kachorsky & Reid, 2022). Developing comics for conservation and environmental education can be applied to not only K-5 elementary school levels but also to the general public. Digital comics have been used to teach concepts at the university level (Sahin & Erol, 2022), indicating the potential for future illustrated educational materials to target a wider audience in addition to younger, emerging citizen scientists. Moreover, alternative methods for dissemination of educational material on hellbender conservation could include developing web-based animation for outreach education for elementary schools, as has been performed for other environmental topics (Safitri et al., 2021), and can provide a follow-up method for learning about the conservation of amphibians or other local species of conservation concern.

Written feedback provided by participants alongside survey responses to **Q1**-**Q4**, highlight the efficacy of using relatively short outreach interactions with physical copies of the coloring book distributed to communicate the importance of amphibian conservation and local biodiversity and potentially not only inform but also change attitude towards hellbenders. This species has a history of exploitation, removal, and harvesting by the public (Nickerson & Briggler, 2007) stemming from common myths that hellbenders “eat all of the fish” or are “poisonous” (Nickerson & Mays, 1973). Therefore, outreach efforts with emphasis on issue-based programming and species-specific activities have the potential to increase societal awareness of declining herpetofauna (Olson & Pilliod, 2022). However, we recommend these coloring books be part of a larger education effort by schools and land managers in close collaboration with researchers to practice active conservation of specific habitats (i.e. wetlands, streams, forests, etc.) and include natural history information on a variety of special status species (i.e. locally threatened or endangered species). This is especially important as management includes removal of recreational dams in National Forests in North Carolina (Figure 5), which may be detrimental to in-stream habitat. Documenting trends of amphibian decline naturally leads to phases of management involving education to the general public.

Figure 5. Examples of Continued Outreach Programming

Previous conservation outreach efforts by authors include local community presentations to both land owners and local environmental groups to raise awareness, for fund raising activities, for ongoing displays at zoos, and for interactive interpretation programs (Figure 5) which emphasize watershed conservation and the human impact on the environment (Shields & Frederick, 2016). This includes outreach education programs near Brevard, North Carolina in Pisgah National forest, education programming in O'Bannon Woods State Park near Corydon, Indiana, and management of instream habitat such as removal of large human-made rock dams in streams in North Carolina. Moreover, state agencies alongside zoo personnel have documented an increase in encounter reports from stakeholders following advertisement in state regulatory pamphlets combined with popular articles and an online documentary in North Carolina (Williams et al., 2019). Overall attitudes towards hellbenders in Indiana have been found to be neutral based on surveys where respondents reported more positive attitudes if they were more familiar with hellbenders (Reimer et al., 2013). Social media outlets, including Facebook and Twitter, can provide important platforms to promote awareness of hellbender research and conservation as engagements by social media users are largely positive towards hellbender salamanders (Hickman & Unger, 2021). Subsequently, the hellbender coloring book developed for this research on O & E included a QR code to an informative website (www.helpthehellbender.com; Figure 6), where the general public can find interactive materials on this unique species of conservation concern. The coloring book is available at https://ag.purdue/edu/department/extension/hellbender/teachers.html, as a six page free pdf download. Lastly, developing partnerships between educators and state managers, can lead to multiple benefits when programming for K-12 teachers is developed. The Purdue Extension and the Indiana Division of State Parks developed such a program and found programming significantly increased knowledge about hellbender

biology, water pollution, reasons for hellbender decline, and what can be done to help hellbenders, etc. (Koetz et al., 2021). Indeed, there are many researchers, educators, students, and other outreach specialists that are working towards improving the general public perceptions of this giant North American salamander. We anticipate that the more educational programming that is implemented across all age groups, both in schools, during outdoor festivals, or as targeted outreach education activities for stream visitors, the more the message will be received about salamanders in streams. Therefore, the future holds much promise for continued efforts centered on the conservation of this unique, large, aquatic salamander across its geographic range.

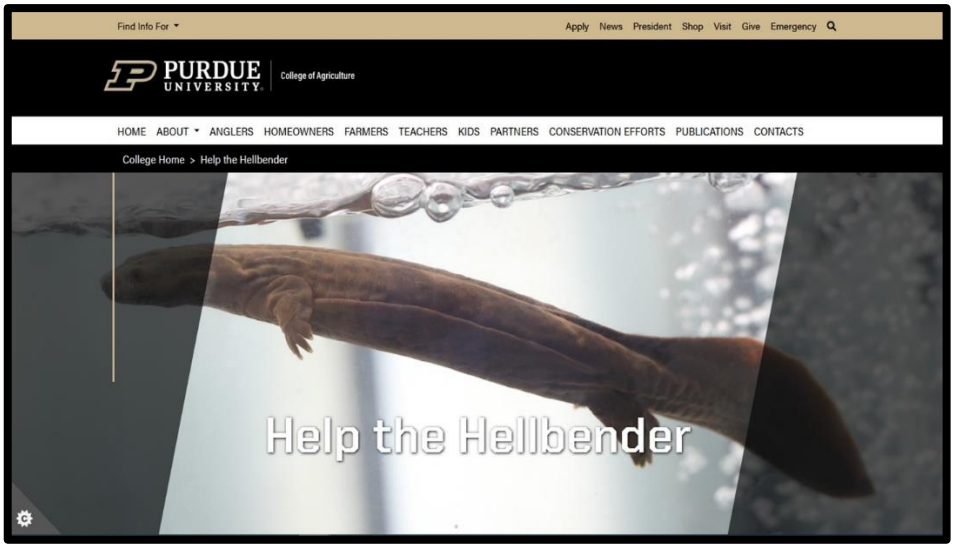

Figure 6. Website about hellbender conservation developed by Purdue University

Conclusion

Our goal for this study was to determine the efficacy of utilizing a coloring book as an educational tool to inform young future citizen scientists about the natural history of hellbenders, how lifting rocks can be detrimental to hellbenders, and to inform future O & E efforts for this unique species of conservation concern. Our findings suggest that coloring for conservation can benefit O & E programing when deployed as part of ongoing citizen science endeavors. There is the further potential outcome of parents learning from children about the importance of conservation by participating in EE programs (Vaughan et al., 2003). Therefore, it is possible that incorporating coloring books, comic books, and other interactive lessons designed for children and younger adults may cross intergenerational boundaries and promote the importance of conservation in local communities of ecosystems and for species of conservation concern. Moreover, the increase in popularity of coloring books for adults, alongside social media campaigns, has raised awareness for library collections (Garner et al., 2016), indicating that coloring books for conservation can further reach communities via social media programs and can even be modified for the online environment.

Recommendations

We recommend educators, state and federal managers, and researchers use similar coloring books to impart EE knowledge on imperiled species conservation and promote the protection of stream and forest habitats. We encourage collaboration among schools and state and federal agencies for developing further outreach education programming which incorporate specific regional conservation goals and additional follow up surveys to gauge public attitudes towards this enigmatic salamander.

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The Effect of Plickers Implementation on 6th Grade Students' Locus of Control (LoC) and Misconceptions

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Abstract

The purpose of this survey is to define the effect of Plickers implementation applied in science lessons on students' locus of control (LoC) and misconceptions. The experimental design was determined as the single-group pre-test and post-test. Fifty-one students studying in the 6th grade participated in the survey. The Nowicki-Strickland Locus of Control Scale (LoC) for Children and the word association test (WAT) is utilized to identify misconceptions at the beginning and end of the lesson. As a result, it was observed that some of the misconceptions of the students changed after the Plickers implementation, but some of the misconceptions did not change. However, after Plickers, it was defined that the LoC points of girls decreased, and the points of boys increased. When the students were examined in general, it was defined that the post-test points they got from the scale were lower than the pre-test points. Although this result does not show any distinction, it is an indication that students' LoC levels are visibly inclined towards inner LoC. In the results of the survey, it can be suggested that the Plickers implementation be used actively in eliminating students' misconceptions and developing their LoC.

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Introduction

Problem-solving and scientific process skills in science provide many benefits to students when faced with a new situation. In addition, science courses provide students with science literacy, mental and hand skills and

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form the basis of vocational education in the fields of science or technology. The teacher's content knowledge and professional formation are important elements that make up an effective science lesson. The science teacher should be a helper who reveals the essence of the students, explains the love of nature and the environment to individuals, follows and maintains scientific developments, does not make mistakes in basic concepts, principles, and generalizations, encourages learning, and always continues to learn (Kaptan & Korkmaz, 1999). Science course is based on observation, learning, and teaching processes. Due to the processes which it contains, this course supports the freedom of the student with activities and experiments. Everyone's actions of understanding, observing, analyzing, and making inferences are distinct from each other, and this creates individual distinctions among students. It is obvious that there are individual distinctions in learning environments and in the process of each lesson. While individual distinctions do not make a lesson inaccessible or incomprehensible, it ensures that the lesson is effective and productive (Yesilyaprak, 2017).

One of the distinctions in individuals, which makes the course meaningful and effective for the student, and influences the academic success of the student, is the LoC. LoC can be explained as individuals assuming the consequences and responsibilities of their own choices or as the realization of choices and events independently of individuals (internally and externally). The place where the forces determining rewards and punishments are concentrated is called the LoC. Individuals develop an outer or inner personality structure according to the situations they are connected to. Individuals who attribute responsibility to the events that happen to them, while individuals who take responsibility for the consequences of events and behavior develop an "inner" personality structure (Rotter, 1966).

According to the results of the research (Carton & Nowicki, 1994; Joe, 1971; Jonassen & Grabowski, 1993; Lefcourt, 1982; Mountain, 1992; Phares, 1976; Rouse & Cashin, 2000; Yuksel, 1991), individuals with inner LoC, intellectual and academic achievement in high awareness of the high social events, resistant against negative influences safe, effective, and independent with respect to the concept of self, capable of taking responsibility, enterprise, entrepreneur, and individuals are emotionally healthier; individuals with an outer focus of control, further, are passive, practical, skeptical and dogmatic individuals with a low level of competence, high depressive characteristics, low level of self-esteem.

When the meta-analytical studies are examined (Cassidiy & Eachus, 2000; Kalechstein & Nowicki, 1997; Nunn & Nunn, 1993), it is determined that there is a critical and high affair among LoC and academic accomplishment. While there is a positive and high correlation between inner control and academic achievement, there is a negatory and high relation between outer control and academic achievement. Age and puberty were the determining factors among these two factors. For example, the relationship between LoC and school performance in primary and university years is higher and more crucial than in secondary education.

When it comes to academic success, teachers have important responsibilities to students in terms of developing inner control in education (Yesilyaprak, 2017). Therefore, it is necessary for teachers to make practices for students to be internally controlled in lessons.

When the literature is examined, the subject of LoC; controlling epistemological beliefs, burnout in primary school teachers, the aggression of students in secondary education institutions, problem-solving perceptions of primary school students, job satisfaction and burnout of guidance and psychological counselors, occupational saturation levels of senior high school students, and stress levels of university students were discussed together (Akbag, Sayiner & Sozen, 2005; Deryakulu, 2002; Efilti, 2006; Kulaksizoglu & Cakar, 1997; Serin & Derin, 2008; Tumkaya, 2000; Uslu, 1999).

When the studies are examined, there is only one study (Mertoglu & Kacar, 2017) in which the portfolio and LoC are studies collectively as a measurement and evaluation implementation, and another study (Mertoglu & Babayigit, 2018) in which the impact of the Plickers implementation on the motivation of middle school students for learning science. However, no study was found in which Plickers measurement and evaluation implementation, and LoC were studied collectively. In this study, it is estimated that the word association test given before the lesson and the measurements and evaluations made after it can change the students' LoC. In this context, the effect of Plickers implementation on 6th grade students' LoC and misconceptions was investigated in this survey.

The problem of this research was defined as follows:

- What are the students' misconceptions about force and motion in the 6th grade science course?
- How does the Plickers implementation in the 6th grade science lesson affect students' misconceptions about force and motion?
- After the Plickers implementation in the 6th grade science lesson, is there a crucial distinction among the pre-test and post-test LoC points of the students?
- After the Plickers implementation in the 6th grade science lesson, is there a crucial distinction between the gender of the students and their LoC?

Method

Research Design

The design of this survey was determined as a quasi-experimental single-group of the quantitative survey methods. The quantitative survey is a kind of survey that presents facts and incidents in an objective,

observable, measurable, and quantifiable way (Fraenkel & Wallen, 2009) in the pre-test / post-test model with the experimental group. Before the experiment, the study group is given a pre-test, and after the implementation, the group is given a post-test. The same measurement tools are used in the pre-test and post-test. If it is detected that there is a crucial distinction between the post-test and the pre-test, it is accepted that this distinction arises from the implementation (Basturk, 2009). In this survey, a quasi-experimental single group model is utilized since it was aimed to examine the effects of Plickers implementation and word association test on 6th grade students' LoC and misconceptions.

Study Group

The study group of the survey is formed of 51 students being educated in the 6th grade in a public school in Zonguldak in the 2021-2022 academic year.

Data Collection Tools

The data collection tools of the survey, the Word Association Test (WAT), and the Nowicki-Strickland LoC Scale for Children were utilized.

Nowicki-Strickland LoC Scale for Children

In this study, the Nowicki-Strickland LoC Scale for Children was enforced on the students as a pre-test and post-test. The scale is formed 40 items. The scale was created in a 2-point Likert type (Yes and No). It can be obtained from a scale between 0 and 40 points. A high score specified a high outer LoC in the individual (Nowicki & Strickland, 1973). In the study conducted by Yesilyaprak (1988), the reliability coefficient was found to be .81. This value is close to the value found in the survey, so it makes the study meaningful. In this survey, Cronbach's alpha value was determined as .74.

Word Association Test (WAT)

In this research, WAT was utilized to detect the misconceptions of the students about force and motion and the words that came to life in their minds. Before the unit was taught, the concepts of "force", "speed" and "balanced force" were given to the students in the WAT. For each concept, they were appealed to write 5 distinct words that came to life in their minds. After writing the words, they were asked to write a meaningful sentence about a given concept related to science. 1 point is given for each correct word given, and 2 points are given for each correct sentence. Words not related to the concept were not scored. Misconceptions that emerged

within the sentences were noted separately and were not included in the scoring. Before the post-test, the same WAT was presented to the students and scored by the researcher.

Plickers

Plickers assessment and evaluation implementation is an evaluation method presented to students in an interactive way. The questions prepared by the researcher are reflected on the smart board in the classrooms. Creating the code system for students, Plickers prepares a card for each student. These cards are printed out and distributed to the students. A, B, C, and D options are given to each corner of the figure on the card (Figure 1). According to the question reflected on the board, the students turned the card in the way he/she wanted. Thanks to the Plickers implementation on the phone, the teacher reads the answer, and the choice is reflected on the blackboard correctly or incorrectly. The evaluation is completed by answering the questions in this way (Plickers, 2021).

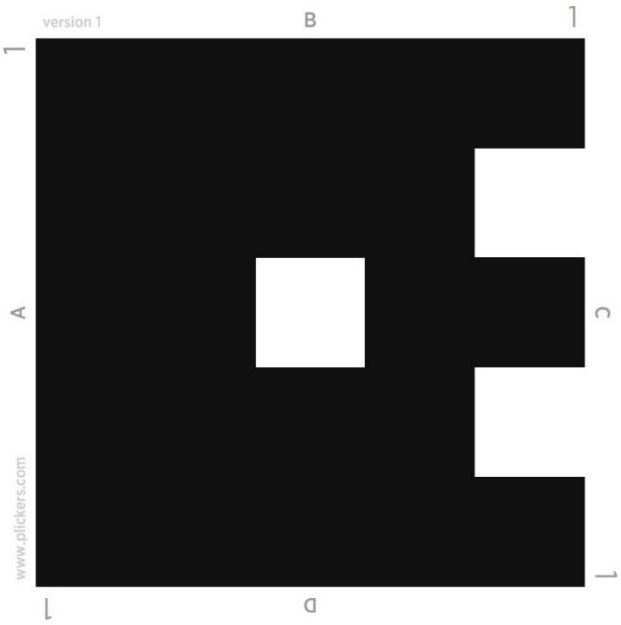

Figure 1. An example of Plickers cards (Plickers, 2021)

Data Analysis

The quantitative data of the survey were analyzed in the SPSS Package Program. The level of importance in the study was determined as 0.05. Since the study group consisted of 51 people, Kolmogorov-Smirnov values were checked in the normality test. It was defined that the variances in the data were normally distributed ($p>.05$). For this reason, the dependent samples t-test, which is a parametric test, was utilized in the pretest-posttest search of the data, and independent samples t-test was used to examine the distinction among pre-test and post-test points and gender. Content analysis was utilized for qualitative data in the survey. Content analysis

is used to interpret content from text data. Content analysis can be divided into three groups: traditional, directed, and summative. In this study, a summative content analysis was managed. Summative content analysis usually includes calculation and equating keywords or contents and then evaluating the elemental context (Hsieh & Shannon, 2005).

Procedure

The Nowicki-Strickland LoC Scale for Children was applied as a pre-test to the study group, which was the participant of the research. Then, WAT was given on force and motion. In the word association test, there are 3 concepts related to the subject in total. Students are asked to write a total of 15 words corresponding to 3 concepts. However, at the end of the concepts, they are expected to write a sentence about the concepts. After the pre-tests were applied, the unit of force and motion was taught by the teacher of the course. In the word association test, Plickers questions were prepared according to the answers given by the students and the sentences they wrote. At the end of the unit, the Plickers assessment and evaluation implementation was applied to the students in the classroom environment. After the Plickers implementation, the WAT was presented to the students again. After the word association test, the LoC scale, which was given as a pre-test, was enforced to the students once again as a post-test. After the LoC scale is done by the students, the implementation ends.

Results

Findings for WAT

In the study, WAT was given to the students before and after the Plickers implementation. The total point of the students from the test was calculated, and their misconceptions were stated below.

Table 1. Points from the WAT

Students	Pre-test's total point	Post-test's total point
51	446	492

When Table 1 was investigated, it was determined that the students got 446 points on the pre-test and 492 points on the post-test.

Table 2. Students Written Words for the Concepts

Concepts	Words Written in the Pre-test	Blanks in Pre-test	Words Written in the Post-test	Blanks in Post-test
Force	Newton, force, N, Dynamometer, power, resultant, resultant force, R, balanced, unbalanced, car, clock, forceful, standing, strong	57	Resultant force, standing clock, moving car, force, Newton, N, dynamometer, strong man, power, unbalanced force, balanced force, unbalanced, balanced	46
Speed	Velocity, car, fast car, km/s, meter, kilometer, hour, second, truck, stationary car, fast car, power, energy, road, distance	38	Fast, lorry, truck, m/s, I'm fast, balanced force, unbalanced force, constant speed, balanced force	39
Balanced Force	Stationary car, stationary clock, stationary house, classroom, desk, board, stationary, resultant force, force	27	Clock on the wall, stationary car, stationary desk, constant speed, constant velocity, stationary, little moving, not moving, standing flower, stopped thing	3

According to the results of the WAT, it was determined that the words noted by the students in the post-test were more accurate and meaningful. It was determined that there was a total of 112 blank expressions in the pre-test, and a total of 88 blank expressions in the post-test. In particular, the reduction in the number of blanks by the students in the post-test shows that the Plickers implementation is instructive. It is noteworthy that the students used to expression "constant velocity" against the concept of "balanced force" in the post-test.

Table 3. Students' Misconceptions in Pre-Test and Post-Test WAT

Pre-test WAT Misconceptions	**f**
Speed is the velocity of an object.	3
Forces are divided into two (resultant force and force).	1
Speeds are divided into two (total distance and minute).	1
Speed is the acceleration of an object over time.	1
When a force is applied to an object, it causes its motion.	1
If the brake is applied, there will be a balanced force.	1
It is divided into two as balanced clock and unbalanced car.	1
The resultant force is an example of speed.	1
We measure the weight of the force with a dynamometer.	1
A car that exceeds its speed is fast.	1
Speed is used in ms/km.	1
A balanced force is that which does not move.	1
The balanced forces always remain the same.	1
Balanced force is to equalize and balance the directions of an object.	1
A balanced force is called a stationary object.	1
Balanced force is moving at an equal.	1
Force is the unit of Newton.	1
There are 42 empty sentences in total.	
Post-test WAT Misconceptions	**f**
Speed is the velocity of an object. (Repeat)	1
If we weigh something and it's equal, it's a balanced force.	1
A car that exceeds is speed is fast. (Repeat)	1
Speed indicates the distance travelled at any given time.	1
Balanced force is the movement of an object at a certain velocity without both accelerating and decelerating.	1
Force is applied in a particular direction or directions.	1
A balanced force is an equal amount of applied force and equality.	1
We measure the weight of the force with a dynamometer. (Repeat)	1
Speed is balanced velocity.	1
If the brake is applied, there will be a balanced force. (Repeat)	1
There are 27 empty sentences in total.	

When the misconceptions table above is examined, the statement "speed is the velocity of an object" in the WAT pre-test and post-test attracts attention. In the post-test, it was defined that the number of empty sentences of the students decreased. This is a positive result for research. However, it is detected that some misconceptions are still repeated in the post-test.

When the table was examined, it was defined that the misconceptions of the students emerged from the confused concepts (Balanced force – constant velocity, force – Newton, balanced force – stopping, force – weight).

Findings for Locus of Control (LoC) Scale

In the study, LoC scale was given to the students before and after the Plickers implementation. The points obtained from the scale were analyzed with the dependent and independent samples t-test.

Table 4. Diagnostic Table for LoC Scale Pre-test and Post-test Points

	N	Total Point	Mean
Pre-test	51	703,00	13,78
Post-test	51	671,00	13,15

According to Table 4, there is a distinction between the pre-test and post-test total points of the students. In accordance with the table, the students got low points on the LoC Scale after the Plickers implementation. This is an indication that students' inner LoC has increased.

Table 5. Dependent Samples t-test Results of LoC Points

	N	Mean	Std.	df	t	p
Pre-test	51	13,78	5,05	50	.882	.382
Post-test	51	13,15	6,30			

It is detected that there is no crucial distinction between the pre-test LoC and post-test LoC of the students. This result is an indication that Plickers implementation did not make a change in students' LoC.

Table 6. Independent Samples t-test Results

	Gender	N	Mean	Std.	df	t	p
Pre-test	Female	25	13,72	5,63	50	.088	.930
	Male	26	13,84	4,53			
Post-test	Female	25	11,92	5,11	50	1.38	.172
	Male	26	14,34	7,16			

There was no crucial distinction among the pre-test and post-test LoC points before the implementation of Plickers and the gender of the colleague.

When Table 6 is investigated, it is detected that the sum of the post-test points of the female students is lower than the sum of the pre-test points, and the sum of the post-test points of the male students is higher than the sum of the pre-test points. This finding shows that the Plickers implementation caused a desired decrease in female students' LoC points, especially since their inner LoC levels increased. However, it was detected that male students' outer LoC increased after the implementation of Plickers, unlike female students.

Discussion and Conclusion

Plickers implementation in the literature (Civitci, 2007; Korkmaz, Vergili, Cakır & Ugur Erdogmus, 2019; Mertoglu & Babayigit, 2018; Mshayisa, 2020; Serin & Derin, 2008; Wiyaka & Praskawayi, 2021) and, WAT on Force and Motion (Balbag, 2018; Sadoglu & Durukan, 2018) there is an insufficient number of studies.

In this study, Plickers implementation did not make a crucial distinction in students' LoC. Similarly, in a study conducted by Korkmaz et al. (2019), it was found that the Plickers implementation did not make a crucial distinction in students' test anxiety. There is a short period of time between the pre-test and the post-test. This may be an indication that students' LoC will not change in a short duration of time.

In the pre-test conducted before the Plickers implementation, the points of the students in the WAT were lower than in the post-test. After the Plickers implementation, the students were able to associate the correct words and reduce the number of blank words. In addition, the misconceptions of the students visibly decreased after the Plickers implementation. Similarly, in studies conducted by Mshayisa (2020), Wiyaka & Praskawati (2021), and Mertoglu & Babayigit (2018), it was defined that Plickers implementation had a positive influence on students' participation in the lesson, their motivation towards science and their learning. The Plickers implementation had a positive effect on correcting students' misconceptions and associating the correct words related to the topic.

In this study, the misconception that "speed and velocity are the same concept" for some of the students in both the pre-test and the post-test was included in the answer sheets. Similarly, there are misconceptions about "speed, and velocity are the same concept" and "speed is almost the same term as velocity" used in a study by Sadoglu & Durukan (2018) and Balbag (2018). Students' learning environments are often informal outside of school. They may have witnessed that the concepts of speed and velocity are used for the same meaning by other individuals in the society, and they may have experienced learning in this way. Because, in terms of physics, there are only displacement and distance distinctions between speed and velocity. However, the concept of travel and displacement in real life is not known to most individuals.

In all tests, it was determined that the outer LoC of female students was lower than male students. Similarly, in the research managed by Civitci (2007) and Serin & Derin (2008), it was defined that male students' outer LoC was higher than that of female students. Men associate their lives with fate, God, destiny, or fortune, while girls are aware that they can direct their own lives.

Recommendation

In this study, although the Plickers implementation did not make a crucial distinction, it can be said that female students increased their inner LoC, while male students increased their outer LoC according to the post-test performed after the implementation. Depending on the results, it can be proposed that teacher candidates should actively use the Plickers implementation, which is an alternative assessment and evaluation method, in their science lessons. When all tests are examined together, it is detected that some misconceptions have not changed. Based on this result, other teaching methods and techniques can be suggested for teachers and teacher candidates (ex., conceptual change texts) to correct misconceptions. This research was conducted with 6th grade students. However, the LoC of students at distinct levels can be measured based on distinct measurement and evaluation tools. This study, which is carried out in parallel with the science, force, and motion unit, can be examined in other courses and subjects.

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Relative Effects of Three Instructional Approaches on Reasoning Skills and Retention of Students in Evolution Concepts

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Abstract

Evolution, a major unifying biological theme that deals with the origin of life on earth, is the concept that most Ghanaian Senior High School (SHS) students hold misconceptions about. This makes its meaningful understanding challenging, especially on problems that require them to think in abstract forms. The author of this study, therefore, investigated the relative effects of three instructional approaches (*demonstrative lecture, problem-based approach, and classroom discussion*) on reasoning skills and retention of Ghanaian Biology students in evolution concepts. A quasi-experimental design was employed for the study. The population comprised all Science Two students in Berekum Municipality and Berekum West District. Multistage sampling techniques were employed to select thirty-nine (39) students for the study. Biology Reasoning Skills Test-Evolution (BRST-E) of a coefficient value of 0.76 was the instrument designed to gather data. Results from the ANCOVA reveal that students exposed to a problem-based approach had a significant gain in their reasoning [$p<0.05$, $\eta^2p=0.193$] and retention [$p<0.05$, $\eta^2p=0.281$], whereas the t-test results revealed that male students made advancements in their reasoning skills than females [$df=24, t=5.08, F=4.36, p<0.05$]. Therefore, Biology instructors in Berekum Municipality and Berekum West District should embrace the use of a problem-based approach in delivering evolution lessons to shape students' levels of reasoning and memory retention.

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Introduction

Biology is a natural Science that deals with the living world, how it is structured, its functions, what these functions are, how it develops, how living things came into existence, and how they react to one another and their environment (Umar, 2011). It is an essential subject for many fields of learning because it contributes enormously to the technological growth of nations (Ahmed, 2008). These fields include Medicine, Pharmacy, Nursing, Agriculture, Forestry, Biotechnology, Nanotechnology, and many other areas (Ahmed & Abimbola, 2011). Biology as a discipline in Ghanaian Senior High School (SHS) curriculum aim is to enable learners to appreciate living things around them. Because of its reputation, more students enrolled for Biology in the West African Senior Secondary Certificate Examination (WASSCE) than for Physics and Chemistry (WAEC, 2017, 2018, & 2019). Studies conducted about the situation of Biology in Ghana indicated that students have challenges in obtaining a sound understanding of numerous concepts underlying it or have misconceptions about them (Adarkwah & Yawson, 2019; Ameyaw, 2016; Ameyaw & Kyere, 2018; Anamuah-Mensah, 1999; Yeboah, 2010). Empirical studies in the field of Biology point out that there are difficulties in teaching Biology concepts such as respiration (Akpinar, 2007), photosynthesis (Akcay, 2017), osmosis and diffusion (Odom & Barrow, 1995), protein synthesis, and cell (Urey & Calik, 2008), inheritance (Lewis & Kattman, 2004), ecology (Cordero, 2001), mitosis and meiosis (Atilboz, 2004) and that students are tugged into misconceptions during instruction.

A topic that is imperative in terms of Biology teaching, which is challenging to cover and haul learners into misconceptions at any moment, is the concept of evolution. Scott (2004) defined evolution as “a cumulative change through time,” which depicts that there are various meanings of evolution, including astronomical, geological, chemical, and biological evolution (p. 23). Wiles (2010) defined evolution as “the diversity of life on Earth [which] has arisen via descent with modification from a common ancestry” (p. 18). The researcher, however, in this paper restricted the term evolution to the aspect of biological evolution only. Also, the term Biology means Elective Biology; thus, the use of Biology teachers and students means Elective Biology teachers and students. In order for Biology teachers to help students develop a scientific understanding of evolution concepts, it is imperative for them to identify which ideas about the concept constitute their misconceptions (Committee on Undergraduate Science Education National Research Council, 1997).

Misconceptions are concepts that students have developed as substitutes for scientifically accepted ones (Cordova et al., 2014). Misconceptions about evolution are well documented (Scott, 2005; Smith, 2010; Yasri & Mancy, 2014). For example, many learners think that evolution usually occurs in a focused track starting from lower taxonomical species towards higher ones (Alter & Nelson, 2002, González Galli & Meinardi, 2011). Pongsophon (2006) reported that many students believed that the organisms themselves make changes in

individual organisms, and they can pass these characteristics on to their offspring. However, Gregory (2009) explained that physical changes that occur during an organism's lifetime could not be passed on to offspring because the cells that are involved in reproduction (the germ line) are separate from those that make up the rest of the body (the somatic line) thus, only changes that affect the germ line can be passed on (p. 169). Students believed that humans evolved from monkeys (Clores & Limjap, 2006; Yasri & Mancy, 2014). Dagher and BouJaoude (2005) found that College Biology students considered no "solid" evidence to authenticate the theory of evolution by wrongly perceiving the certainty of the theory of evolution by expressing two radical views towards the degree of certainty. Dagher and BouJaoude (2005) further reported that some students viewed the theory of evolution as static, whereas others considered that it remains unclear and will be changed. Scott (2005) argued that, in everyday use, a "theory" means a guess. In science, a theory is not a guess but "a logical construct of facts and hypotheses that attempt to explain a natural phenomenon" (p. 241). Therefore, students' perception that "evolution is just a theory" is a vernacular misconception used to reject evolution on the ground of disbelief rather than logical arguments.

In Ghana, reasoning skills/abilities and retention of concepts among learners are very crucial variables in the Biology curriculum. Holyoak and Morrison (2005) contended that scientific reasoning skills mark the development of cognition that is required for real decision-making and problem-solving. Reasoning skills are central to the process of knowledge attainment and conceptual change (Kuhn (2004), as cited in Zeineddin & Fouad, 2010). According to Kuhn (2004), scientific reasoning is a sentimental, decisive knowledge seeking-process that is social in nature. It is a process that people go through in order to review their ideas and build new understandings and that, the heart of this reasoning process is coordination of theory and proof, which does not only mean reviewing the theory in the light of the proof but distinguishing between and envisioning both (Kuhn, 2004). Students' inability to reason critically results when instructors employ teaching strategies where they act as inert participants by not assigning them direct activities (Irwanto & Prodjosantoso, 2018).

According to Bichi (2002), perpetual and eloquent learning is the aim of every educational endeavor. Ogundokun and Adeyemo (2010) contended that because of these, understanding and retention are the products of meaningful learning when teaching is effective and meaningful to learners. Thus, proper coding of new information provides the index that may be referred to so that retention takes place without intricate search that subsequently empowers learners to reminisce about what they have experienced or what they have in memory. Aggarwal (2008) stated that good memory and retention lead to meaningful learning that results in the production of a series of changes within learners' entire cerebral structure, alters their existing concepts, and enables them to form new connections between them. Learners' reasoning skills and their ability to recall evolution concepts require instructors to employ instructional approaches that result in cognitive disequilibrium among them to aid clear their misconceptions. To help students develop broader conceptions about scientific

phenomena, teachers should subject learners to cognitive processes that cause them to face and alter their existing conceptions (Dantonio & Beisenherz, 2001). Anjum and Abida (2013) stated that there are two major approaches to addressing misconceptions in order to enhance conceptual change among students. The former, behaviorism, explains the behavioral pattern of learners, whilst the latter, known as cognitive psychology, provides assistance for learners to understand human thought processes. Thus, instead of teaching and learning sequestered bits of "inert knowledge," recent Science Education opines the need for "quality over quantity, meaning over memorizing, and understanding over awareness" (Mintzes et al., 2001). For this reason, Liras (1994) stated that Science instructors should help students connect theoretical concepts with the practical aspects of the real world via their motivation.

According to WAEC Chief Examiner Report (2017, 2018, & 2019), despite the popularity of Biology, results of research studies always reveal declines in the performance of students in the subject compared to Physics and Chemistry owing to the fact that the discipline include lots of abstract concepts which cause numerous students to have challenges in constructing its meaningful understanding. Senior High School Biology students in Berekum Municipality and Berekum West District are victims of this situation. Evidence gathered by the researcher from the Berekum Municipality and Berekum West District Educational Directorate shows that the problem prevails within the setting. In 2018, out of the 572 candidates who sat for May/June WASSCE, 263 (45.98%) obtained grades A1-C6, whilst 309 (54.02%) obtained grades D7-F9. In 2019, for instance, out of the 603 candidates who sat for the same examination, 297 (49.25%) obtained grades A1-C6, while 306 (50.75%) obtained grades D7-F9. In 2020, 679 candidates sat for the examination, and out of these, 337 (49.63%) obtained grades A1-C6, whereas 345 (50.37%) obtained grades D7-F9. It can be deduced from the WASSCE results that the percentage of candidates that obtained lower grades in 2018, 2019, and 2020 is 54.02%, 50.75%, and 50.37%, respectively. Though the percentage of students that obtain grades D7-F9 is declining uniformly in these respective years, it can be inferred from the data that Biology students performed abysmally poor during WASSCE in the past three years because the percentage of candidates who obtained grades A1-C6 in these subsequent years did not exceed 50.0%. There are different teaching methods that can be employed by instructors to improve upon students' educational variables such as performance, reasoning, memory retention, interest, motivation, and attitudes toward Biology concepts rather than a formal lecture approach. Some of these include; interactive lectures, concept maps, jigsaw, demonstrative lectures, inquiry, classroom discussion, problem-based approaches, and project-based approaches. Empirical studies have revealed that demonstrative lectures in which teachers deliver lessons verbally and act when the need arises at intervals for students to watch and exhibit those actions later are influential in enhancing learners' reasoning skills (Duruji et al., 2014; Sweeder & Jeffery, 2013) and their retention abilities (Auwal, 2013; Hemanthakumar et al., 2013; Ogologo & Wagbara, 2013; Price & Brooks, 2012). Problem-based approach, which involves instructors posing "ill-structured" problems to learners for they to find solutions to those problems themselves, is also potent in

improving learners' reasoning skills (Arifin et al., 2019; Karaçalli & Korur, 2014; Michel et al., 2012; Rakhshanda, 2013) and knowledge retention (Arifin et al., 2019; Leuchter et al., 2014; Strobel & van Barneveld, 2019). Classroom discussion encompassing the exchange of ideas between instructors and students and or between the learners themselves is also effective in enhancing students' reasoning skills (Cazden & Beck, 2003; Sun et al., 2015; Webb et al., 2015) and knowledge retention (Christianson & Fisher, 1999; de Grave et al., 2001; Falode et al., 2015). Despite the potentials associated with these instructional approaches in improving learners reasoning abilities and their long-term knowledge retention across various disciplines, it is unknown, particularly in Ghana, that a study has been carried out to investigate the relative effects of demonstrative lecture, problem-based approach, and classroom discussion on the reasoning skills and retention abilities of Biology students in evolution concepts at the Senior High School level. This study, therefore, seeks to seal this knowledge gap. The purpose of the study, therefore, is to investigate the relative effects of the three instructional approaches on reasoning skills and retention of Ghanaian Biology students in evolution concepts.

Related Hypotheses

Ho1- There is no statistically significant difference in the mean prior knowledge scores of students to be taught evolution using demonstrative lecture, problem-based approach, and classroom discussion.

Ho2- There is no statistically significant difference in the mean Biology reasoning skills scores of students taught evolution concepts using demonstrative lecture, problem-based approach, and classroom discussion.

Ho3- There is no statistically significant difference in the mean retention scores of students taught evolution concepts using demonstrative lectures, problem-based approach, and classroom discussion.

Ho4- There is no statistically significant difference in the mean reasoning skills scores of male and female students in the experimental group.

Method

Research Design

The non-equivalent pretest posttests quasi-experimental design was employed for the study.

Population, Sample and Sampling Techniques

The population comprised all public SHS 3 students in Berekum Municipality and Berekum West District, Bono Region. The target population consisted of all Biology students within the two selected schools in Berekum Municipality and one school in Berekum West District, with the accessible population comprising all

Science Two (SC2) students within each school. Multistage sampling techniques were employed. Convenience sampling was used to select students on the researchers' first visit to each school. Afterward, a systematic approach was employed by the researcher to select every third member from each of the classes. Thirty-nine (39) students were selected for the study. The detail of the sample is distributed in Table 1.

Table 1. Distribution of Students to the Instructional Methods and their Sample Sizes

School	Students Sampled	Conveniently	Sample Size
SHS X (Demonstrative Lecture Group)	41		13
SHS Y (Problem-Based Group)	34		11
SHS Z (Classroom Discussion Group)	47		15
Total	**122**		**39**

Instrument

Biology Reasoning Skills Test-Evolution (BRST-E) was the instrument designed to gather data. The items were constructed to cater to the application of knowledge and analysis dimension consisting of twenty (20) multiple-choice items and ten (10) one-word answers/phrases items.

Validity, Pilot-Testing, and Reliability of Instrument

The instrument was handed over to three Biology instructors teaching in Colleges of Education to analyze it vividly to ascertain its content and construct validity. After the validation exercise, the items that were not measuring reasoning skills and those that contradicted the requirements of the syllabus were reconstructed. This was to ensure the credibility of the difficulty and discrimination indexes of the instrument. Afterward, accidental sampling was employed to select twelve biology (12) students from Drobo SHS, an institution that shares similar characteristics with that of the study area, and the instrument was pilot tested on them. The reliability of the instrument was computed using Kudder-Richardson (KR-20) formula, and the coefficient was found to be 0.76. Therefore, the instrument was considered reliable for data collection since its coefficient value obtained lies within the acceptable benchmarks of all reliable instruments (Ary et al., 2002).

Procedures for Data Collection

The researcher sought permission from the authorities in the various institutions where the study was conducted. A pre-BRST-E was administered to the selected students in each school on the second visit to solicit their prior knowledge about the topic before subjecting them to a teaching approach. Each of the teaching

groups was assigned randomly to one of the three instructional strategies by means of the researcher's own judgment. Students at SHS X were assigned as the Control Group (CG) and were exposed to demonstrative lecture; SHS Y students were assigned as Experimental Group One (EG1) and were subjected to a problem-based approach, whereas SHS Z was assigned as Experimental Group Two (EG 2) and was subjected to classroom discussion. Each respective group was subjected to their teaching methodology for four (4) weeks. Immediately after the fourth week, a post-BRST-E was administered to them to ascertain the effect of each strategy on their reasoning skills. The post-post-BRST-E was administered to the students three weeks after the post-BRST-E to determine the memory retention abilities of students from the post-BRST-E to the post-post-BRST-E. After each BRST-E, the scores of each instructional group are recorded separately, likewise those of males and females.

Procedures for Data Analysis

Data were analyzed using various statistical tools by using Version 22 of Statistical Package for Social Sciences (SPSS) by employing descriptive statistics and inferential statistics, with each inferential tool tested at 0.05 alpha level of significance. Mean, standard deviation, and Single-factor Analysis of Variance (ANOVA) was used in analyzing the pre-BRST-E scores. Means, standard deviations, minimum scores, maximum scores, Analysis of Covariance (ANCOVA), Gabriel Post Hoc Test, and partial eta squared (η^2p) were used to analyze the post-BRST-E (reasoning skills) scores. The post-post-BRST-E (retention) scores were analyzed using means, standard deviations, mean decline scores, paired sample t-test, ANCOVA, Gabriel Post Hoc Test, η^2, and η^2p. Finally, the reasoning skills scores of males and females were analyzed using means, standard deviation, and independent t-tests.

Results and Discussion

Ho1-There is no Statistically Significant Difference in the Mean Prior Knowledge Scores of Students to be taught evolution using Demonstrative Lecture, Problem-Based Approach, and Classroom Discussion

In determining whether the students selected from the schools are equal in terms of their prior knowledge of evolution concepts, their pre-BRST-E scores were analyzed using descriptive and inferential statistics. The result of the descriptive analysis is presented in Table 2.

Table 2. Descriptive Analysis of Equality of Students' Prior Knowledge Scores

Instructional Group	N	Mean	Std. Deviation	Minimum	Maximum
Demonstrative Lecture	13	20.3077	3.66025	15.00	27.00
Problem-Based	11	21.3636	4.36515	14.00	28.00
Classroom Discussion	15	19.8667	3.46135	14.00	29.00
Total	**39**	**20.4359**	**3.74724**	**14.00**	**29.00**

It can be inferred from the data in Table 2 that the pre-BRST-E mean scores of students were 20.31, 21.36, and 19.87, with standard deviations of 3.66, 4.36, and 3.46, respectively, for students assigned to demonstrative lecture, problem-based approach, and classroom discussion respectively. This spells out clearly that students that were assigned to the problem-based approach attained a high mean and standard deviation pretest score, followed by those assigned to demonstrative lecture and, finally, those that were assigned to classroom discussion. In order to ascertain whether there is any statistically significant difference among these mean scores, ANOVA was carried out to claim the fact, as indicated in Table 3.

Table 3. ANOVA Analysis of Homogeneity of Students' Prior Knowledge

Sources of Variation	Sum of Squares	df	Mean Square	F	p
Instructional Groups	14.542	2	7.271	.504	.61
Pre-BRST-E Scores	519.048	36	14.418		
Total	**533.590**	**38**			

Data in Table 3 spells out clearly that [$F(2,38)=0.504$, $p=0.608 > 0.05$] suggests no statistically significant difference, so the null hypothesis is maintained. This clarifies that before the study, students from the three schools held similar views in terms of their intellectual ability levels in evolution concepts depicting that they were suitable for the study because neither group's previous knowledge prevailed over the other.

Ho2-There is no Statistically Significant Difference in the Mean Reasoning Skills Scores of Students Taught Evolution Concepts using Demonstrative Lecture, Problem-Based Approach, and Classroom Discussion

In determining which of the instructional methodology was more powerful in enhancing students' reasoning skills, the mean performance scores, standard deviations, maximum score, and minimum score of each respective teaching strategy generated during the post-BRST-E is illustrated in Table 4 to boost the assertion.

Table 4. Descriptive Analysis of Students' Reasoning Skills Scores

Instructional Group	N	Mean	Std. Deviation	Minimum	Maximum
Demonstrative Lecture	13	26.0769	3.83974	19.00	31.00
Problem-Based	11	32.9091	5.08831	20.00	37.00
Classroom Discussion	15	31.2667	3.91821	20.00	35.00
Total	**39**	**30.0000**	**5.04715**	**19.00**	**37.00**

It can be deduced from the data in Table 4 that the post-BRST-E mean score of students is 26.08, 32.90, and 31.27, and standard deviations of 3.83, 5.09, and 3.92, respectively, for the students that were taught using demonstrative lecture, problem-based approach, and classroom discussion respectively. This reveals clearly that students subjected to a problem-based approach obtained a higher posttest mean mark, followed by those exposed to classroom discussion and, finally, demonstrative lecture. The Table further pointed out that students that were exposed to problem-based approach and classroom discussion had the highest minimum score of 20. In addition, the data clarified that the problem-based group had the higher maximum score of 37, followed by the classroom discussion group with a score of 35. Finally, the Table established that demonstrative lecture group students obtained the lowest minimum and maximum scores of 19 and 31, respectively.

In ascertaining whether there is any statistically significant difference between these mean scores, ANCOVA analysis was carried out in order to establish the fact as indicated in Table 5.

Table 5. ANCOVA Analysis of Students' Reasoning Skills

Source of Variation	Sum of Squares	df	Mean Square	F	p	η^2p
Corrected Model	347.045	3	115.682	6.520	.001	.359
Intercept	446.589	1	446.589	25.172	.000	.418
Covariate (Pre BRST-E Scores)	29.811	1	29.811	1.680	.203	.046
Instructional Groups	148.211	2	74.106	4.177	.024	.193
Error	620.955	35	17.742			
Total	**36068.000**	**39**				

Data from Table 5 points that [$F(2,39)=4.18$, $p=0.024 < 0.05$] reveals a statistically significant difference, so the null hypothesis is rejected because the reasoning skills scores of students in the various instructional groups were different. Since significant difference exists among the teaching groups, Multiple Comparison Analysis (Gabriel Post Hoc Test) was carried out to discover which of the instructional groups' mean reasoning skills scores was statistically significantly dissimilar from each other and is presented in Table 6.

Table 6. Gabriel Post Hoc Analysis of Students' Reasoning Skills Across the Teaching Groups

(I) Instructional Group	(J) Methodology	Mean Difference (I-J)	Std. Error	p
Demonstrative Lecture Group	Problem-Based	-6.83217*	1.74180	.001
	Classroom Discussion	-5.18974*	1.61110	.008
Problem-Based Group	Demonstrative Lecture	6.83217*	1.74180	.001
	Classroom Discussion	1.64242	1.68774	.700
Classroom Discussion Group	Demonstrative Lecture	5.18974*	1.61110	.008
	Problem-Based	-1.64242	1.68774	.700

*. The mean difference is significant at the 0.05 level.

It can be deduced from the data in Table 6 that a pairwise comparison between the demonstrative lecture group and the problem-based group resulted in [p=0.001< 0.05], suggesting a significant difference, so the null hypothesis is not maintained. The efficiency of the instructional approaches in increasing the reasoning skills of students differs. Furthermore, the Table revealed that the comparison between the demonstrative lecture group and classroom discussion group produced [p=0.008< 0.05] reveals a statistically significant difference, so the null hypothesis is not maintained because the effectiveness of the two instructional approaches in increasing students' reasoning abilities was different from each other. Moreover, the analysis reveals that pairwise comparison between the problem-based group and classroom discussion group yielded [p=0.70 > 0.05] portrays no statistically significant difference, so the null hypothesis is maintained owing to the fact that the potential of the two instructional strategies in enhancing students' reasoning skills was similar.

From the above assertions, it elucidates that out of the three instructional groups, students that were taught evolution concepts by problem-based approach had an increase in their levels of reasoning better than their counterparts who were taught the same concept using classroom discussion and demonstrative lecture approach based on the data illustrated in Table 5 and the p values demonstrative lecture group established with it during the Post Hoc Analysis. The value of η^2p in Table 5=0.193 suggests that the problem-based approach was influential in contributing 19.3% of the variance of students' reasoning skills scores. This finding corroborates Arifin et al. (2019) and Karaçalli and Korur (2014), who reported that a problem-based approach increased students' reasoning abilities more than other teaching methodologies in their study.

Ho3-There is no Statistically Significant Difference in the Mean Retention Scores of Students Taught Evolution Concepts using Demonstrative Lecture, Problem-Based Approach, and Classroom Discussion

In order to establish the degree of mean decline in the mean scores of students that were subjected to the respective instructional methodologies, paired samples t-Test was carried out to determine its extent from the post-BRST-E to the post-post-BRST-E. The results are illustrated in Table 7.

Table 7. Mean Decline and Paired Sample T-Test Analysis of Students' Scores from the Post-BRST-E to the Post-Post-BRST-E

Instructional Group	M_P	M_{PP}	Mean Decline (M_P-M_{PP})	Std. Deviation	df	t	p	η^2
Demonstrative Lecture	26.0769	23.3846	2.6923	4.23054	12	-2.295	0.041	0.334
Problem- Based	32.9091	29.1818	3.7273	5.63915	10	-2.353	0.045	0.980
Classroom Discussion	31.2667	27.6667	3.6000	5.46155	14	-2.553	0.023	0.642

M_P = Mean of post-BRST-E Scores M_{PP} = Mean of post-post-BRST-E Scores

The data in Table 7 clearly point out that the mean decline of students from the post-BRST-E to the post-post-BRST-E in each of the respective teaching groups was statistically significant. Students that were exposed to demonstrative lectures had the lowest mean decline and SD of 2.96 and 4.23, respectively. Students in the classroom discussion group whose mean declined and SD was 3.60 and 5.46, respectively, followed it. Students in the problem-based group had the highest mean decline of 3.72 and a high SD=5.63. These points show that retention favors students in the demonstrative lecture group, followed by the classroom discussion group, and finally, students in the problem-based group. The Table further reveals that the p-value of students in the demonstrative lecture group, classroom discussion group, and problem-based group is 0.041, 0.045, and 0.023, respectively. This suggests that retention favors students in problem-based groups followed by demonstrative lecture groups and, finally, classroom discussion groups. The data finally revealed that η^2p of the demonstrative lecture group, classroom discussion group, and problem-based group is 0.33, 0.98, and 0.64, respectively. This implies that retention favors students in problem-based groups followed by classroom discussion groups and, finally, demonstrative lecture groups. However, in establishing whether differences exist in the mean decline scores among the respective instructional groups, their post-post-BRST-E (retention scores) were subjected to ANCOVA and are presented in Table 8.

Table 8. ANCOVA Analysis of Students' Retention across the Teaching Groups

Source of Variation	Sum of Squares	df	Mean Squares	F	p	η^2p
Corrected Model	225.475	3	75.158	4.638	.008	.284
Intercept	802.451	1	802.451	49.517	.000	.586
Covariate (Students Sex)	.855	1	.855	.053	.820	.002
Instructional Groups	221.902	2	110.951	6.847	.003	.281
Error	567.192	35	16.205			
Total	**28526.000**	**39**				

It can be deduced from the data in Table 8 that [F(2,39)=6.85, p=0.003 < 0.05] reveals a significant difference, so the null hypothesis is rejected. The memory retention abilities of students in the teaching groups were different. Since a statistically significant difference exists, Gabriel Post Hoc analysis was carried out to establish where the difference exists. The result is presented in Table 9.

Table 9. Gabriel Post Hoc Analysis of Students' Retention across the Teaching Groups

(I) Instructional Groups	(J) Methodology	Mean Difference (I-J)	Std. Error	p
Demonstrative Lecture Group	Problem-Based	-5.79720*	1.62734	.003
	Classroom Discussion	-4.28205*	1.50523	.021
Problem-Based Group	Demonstrative Lecture	5.79720*	1.62734	.003
	Classroom Discussion	1.51515	1.57683	.708
Classroom Discussion Group	Demonstrative Lecture	4.28205*	1.50523	.021
	Problem-Based Group	-1.51515	1.57683	.708

*. The mean difference is significant at the 0.05 level.

Gabriel Post Hoc Analysis in Table 9 reveals that pairwise comparison between the demonstrative lecture group and problem-based group resulted in [p=0.003< 0.05], suggesting a significant difference, so the null hypothesis is rejected. The potentials of the instructional approaches in increasing the recollection abilities of students differ. Furthermore, the Table revealed that the comparison between the demonstrative lecture group and classroom discussion group produced [p=0.021< 0.05] reveals a statistically significant difference, so the null hypothesis is not maintained because the effectiveness of the two instructional approaches in increasing students' remembering abilities was different from each other. Moreover, the analysis reveals that pairwise comparison between the problem-based group and classroom discussion group yielded [p=0.71> 0.05] portrays

no statistically significant difference, so the null hypothesis is maintained. The potential of the two instructional strategies in enhancing students' retention abilities was similar.

It can be deduced from the statements above demonstrative lecture, and problem-based group resulted in [p=0.003] and yielded [p=0.021] with classroom discussion and no statistically significant difference manifested between the problem-based group and classroom discussion group [p=0.71]. This elucidates that out of the three instructional groups, students that were taught evolution concepts by problem-based approach had an increase in their memory retention magnitudes better than their counterparts who were taught the same concept using classroom discussion and demonstrative lecture based on the respective p values they established among themselves during the Post Hoc Analysis in Table 8. The value of η^2p in Table 5=0.281 suggests that the problem-based approach was influential in contributing to the variance in students' memory retention scores by 28.1%. The finding agrees with Leuchter et al. (2014) and Strobel and van Barneveld (2019), who found positive results in problem-based approaches in enhancing learners' memory retention in their separate studies.

Ho4-There is no Statistically Significant Difference in the Mean Reasoning Skills Scores of Male and Female Students in the Experimental Group

In determining whether the reasoning abilities of males and females in the experimental group are similar or not, their post-BRST-E scores were analyzed using both descriptive and inferential statistics. The result of the descriptive statistics is presented in Table 10.

Table 10. Descriptive Analysis of Reasoning Skills Scores of Males and Females

	Gender	**N**	**Mean**	**Std. Deviation**
Scores	Males	14	34.8571	1.51186
	Females	12	28.5833	4.33712

It can be inferred from data in Table 10 that the post-BRST-E mean scores of male and female students are 34.86 and 28.58, and standard deviations of 1.51 and 4.34, respectively. However, in establishing whether differences exist in their mean reasoning skills, their post-BRST-E scores were subjected to an independent t-Test, which is presented in Table 11.

Table 11. t-Test Analysis of Males and Females Reasoning Skills

Group		Levene's Test for Equality of Variances				
		F	Sig.	t	df	p
Scores	Equal variances assumed	4.361	.048	5.079	24	.000
	Equal variances not assumed			4.769	13.289	.000

Data in Table 11 point that [df=24, t=5.08, F=4.36, p=0.000< 0.05] suggests a significant difference, so the null hypothesis is rejected. Males' and females' levels of reasoning regarding evolution concepts differ from each other in favor of males. The finding corroborates that of Yenilmez (2006), who found that male students had higher scores than females on proportional, probabilistic, and combinational reasoning. Similarly, Valanides's (1996) study on 12th-grade Cypriot students' reasoning abilities reported that males outperformed females in proportional and probabilistic reasoning.

Conclusions

The results reveal because students exposed to the problem-based approach tried to find solutions to ill-structured problems posed to them, it challenged them to address associated tasks that were beyond their current ability levels, which made it eligible for them to think in abstract terms, which made it eligible for them to solve high-order problems compared to their counterparts taught the same concepts using demonstrative lecture and classroom discussion [$F(2,39)=4.18$, $p<0.05$, $\eta^2p=0.193$]. In addition, the problem-based approach made students experience little confusion and interferences, and this accelerated their memory retention abilities more than the other students exposed to the other strategies [$F(2,39)=6.85$, $p<0.05$, $\eta^2p=0.281$]. Finally, male students were always observed making individual advancements about their freshly learned knowledge and skills in real situations, and this led to an upsurge in their high-order reasoning skills than their female counterparts [df=24, t=5.08, F=4.36, p<0.05].

Recommendations

1. Biology instructors in Berekum Municipality and Berekum West District should embrace the use of a problem-based approach in delivering evolution lessons to shape students' level of reasoning and memory retention.
2. Ministry of Education, in collaboration with Ghana Education Service, should encourage Science instructors in Berekum Municipality and Berekum West District to teach students how to make use of a problem-based learning approach. Their appreciation that students' sex, learning style, learning

motivation, learning skills, reasoning skills, memory retention, and difficulties in learning Biology are all embedded in a problem-based approach which in turn affects their achievement.

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The Challenges of Distance Education and Evidence-Based Solution Suggestions

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Abstract

Today, the development of technology and the internet plays an essential role in providing equal opportunities in education. Distance education studies facilitate education and training by providing education opportunities independent of time and place. There are some difficulties experienced in maintaining distance education, which is increasing in popularity daily with the advantages it offers in the learning process with technological developments. In this study, by considering the difficulties experienced in the distance education process, suggestions are made for both system developers and teachers who are the implementers of the system. In the first part of the study, the difficulties brought by distance education, and in the second part, suggestions compiled from the results of the studies on eliminating the challenges experienced are included. For this reason, it is thought that this study will contribute significantly to education technologists, content managers, teachers who teach with the distance education system and policy providers who develop the distance education system.

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Introduction

Learning is a lifelong process with the experiences of individuals, the education they receive and the knowledge they acquire. With the rapid development of the internet and, accordingly, technological devices, education is no longer a process that takes place only at school but can become a phenomenon that can be realized in any environment where the internet is available. At the beginning of the conveniences provided by the internet in

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education, fast access to information and a flexible learning environment can come first. Access to information through distance education can be provided systematically and formally.

According to the USDLA- United States Distance Learning Association (2005), distance education has been defined as a learning structure in which no physical teacher supports lifelong learning for every individual covering all technologies. According to Özkul and Aydın (2020), distance education is the learning process in which the learners are temporally and physically separated from the instructor and each other, and remote communication systems provide the communication between them. Along with the developing technological opportunities, distance education can become an education system that can appeal to all age groups from being a system used only by adults for career purposes. Still, there are two main reasons for the widespread use of distance learning: institutional and country needs (Özkul & Aydın, 2020). Institutional reasons for expanding distance education: to increase access to education, provide flexibility to students in terms of time and space, reduce education costs, reach students in different geographies, and use new technologies in education (Cavanaugh, 2001; Oblinger, 2000). The reasons for its spread across the country can be shown as distance education provides convenience in many ways compared to traditional education, and it is necessary to meet the demand that conventional education cannot meet (Özkul & Aydın, 2020).

With the global problems experienced in recent years, especially with the emergence of the pandemic period, there has been a compulsory transition from traditional education to distance education, and a compulsory change has been made in the spatial dimension of education. This change has brought along some opposition from teachers and students for many reasons, such as not wanting to be involved in the process due to a lack of knowledge about the use. All parties must be persuaded and included for this change and transformation process to be effective (Öncü, 2020). To control many variables, we can call the difficulties of distance education. The cause of the problems should be analyzed well. After defining the issues with a holistic approach, necessary and appropriate intervention methods can be developed regarding the source of the problem. In this study, firstly, the difficulties experienced in distance education and the suggestions compiled from the results of the studies carried out to eliminate these difficulties and maintain the distance education process effectively are included. It is thought that this study will guide the instructors and content producers who will plan lessons according to the distance education system and design them accordingly. For this reason, it is predicted that this study will have an important place in the literature.

In this study, the difficulties experienced in distance education, accompanied by the literature, are divided into pedagogical problems and institutional challenges and then presented by sub-titles. The studies in the literature were compiled by examining the document analysis method and presented under two main headings: difficulties and suggestions.

Distance Learning

Distance education can be defined as the presentation of programs in formal education to students with internet-based distance education systems (Özkul & Aydın, 2020). The most distinctive feature of distance education, a structured learning environment, is the separation of students and teachers in terms of space and time (Gunawardena & McIsaac, 2013). The benefits of distance education are one of the most critical factors that cause its use to become widespread. However, it cannot be ignored that some difficulties are experienced in the distance education process. Determining the problems encountered in distance education is essential for improving the process. The challenges experienced in distance education are presented below with their subheadings.

What Special Challenges Does Distance Education Bring?

This section examines the difficulties brought by distance education from a pedagogical and institutional perspective.

Pedagogical Challenges

Selection and Application of Appropriate Instructional Strategies

The fact that the teacher and the student are not physically in the same environment in distance education can be shown as the most crucial factor distinguishing distance education from traditional classroom education. Although this physical distance between the student and the teacher provides flexibility from space and time, it causes the benefits of face-to-face communication to be ignored. In face-to-face communication, the teacher may have information about the student's facial expression, approach to the material and the subject, and attitudes and behaviours towards the lesson. In contrast, the teacher may have minimal information about his students in distance education.

For this reason, a design cannot be made according to individual student differences in course design, and the course content is designed in a standard way. Dwyer (1991) suggests using instructional coherence and coherence paradigms when creating distance education materials to match material content with students' ability levels.

One of the reasons why individuals, especially adults, prefer distance education, is to receive education without time constraints. For this reason, the number and diversity of those who prefer distance education is increasing. In distance education systems, which allow individuals from different cultures and regions to receive education,

learning diversity and individual differences may include more diversity than in the traditional school system. For this reason, while designing the course contents, considering this diversity and considering multiple intelligence theories, planning to address differences will bring the efficiency of distance education to the highest level.

Teaching methods and techniques should be used to enable students to gain skills such as critical thinking skills, knowledge construction, reflection, and problem-solving skills brought by the constructivist approach, and a course should be planned accordingly. The number of studies in the literature on this subject is gradually increasing, and topics such as knowledge construction and mediated learning (Barrett, 1992; Glaser, 1992; Harasim, 2001; Salomon, 1993) can be seen as promising research in distance education.

The lack of interaction is the most crucial issue in the design and implementation of the course, which is lacking in distance education. Çağıltay (2001) attributes one of the reasons why students do not follow the practices of OEF, which is made without considering pedagogical elements. According to Çağıltay (2001), the design of lessons devoid of interaction and cooperation without considering the pedagogical features is among the factors that undermine the distance education system, even though the technological possibilities have improved. For this reason, since learning becomes permanent and meaningful with interaction, lessons should be taught according to learning models between student groups, and teaching methods and techniques should be included in this context.

Another missing aspect of distance education is the evaluation phase. To reduce the cost and workload in distance education institutions in Turkey, especially OEF, evaluations are made as tests, and different alternatives cannot be used (Latchem et al., 2006). However, studies (Gaytan & McEwen, 2007) show that teachers and students more accept different digital assessment methods. For example, Newhouse's (2011) feasibility study on the use of digital technologies that can be used as an alternative to traditional assessment methods in performance evaluation has concluded that both the digital portfolio and the computer-based exam are implemented without significant technical difficulties. The acceptance by students and teachers is high. Inspired by the results of the studies conducted in distance education, different digital assessment methods with proven effectiveness and efficiency can bring the assessment process to a satisfactory level for teachers and students.

Maintaining Quality as the Number of Students Increases

Quality assurance in distance education can be achieved by determining policies that guarantee quality for both students and faculty members (Gunawardena & McIsaac, 2013). Both national and international education

policies and strategies for quality assurance in e-learning environments should be mentioned. Many countries produce reports on quality assurance in education. For example, The Pew Symposium in Learning and Technology produced a report on issues surrounding policymaking and quality assurance from the perspectives of institutions and organizations (Twigg, 2001). According to this report, Institutions and organizations should determine their standards by taking support from the literature to provide quality education to students. With the report prepared for the Canadian Community Education Association, quality guidelines for online education and training in Canada were established (Barker, 2001). According to this directive, With the increase in the number of students involved in distance education day by day, to ensure efficiency and motivation, the "teaching support centres" in universities in developed countries should be expanded, and besides technical support, academicians should be supported on how they should take pedagogical approaches in the Web environment (Çağıltay, 2001).

According to Latchem et al. (2006), a standardized quality for the distance education system should be determined to achieve quality in distance education. In addition, suitable competitive environments should be provided to increase the demand for distance education. Again, with the increasing number of students, to create quality standards, resources can be used economically, and content sharing can become easy by designing courses that cannot be divided into course environments and that consist of well-designed learning objects instead of extensive classes (Karaman, 2020). Therefore, teachers can benefit from learning things while designing their lessons. Learning objects can be used over and over again after they are prepared (Millar, 2002), which reduces the course load of the instructor and allows them to gain time to use other resources to make the lesson more effective, as well as helping to standardize on quality.

New Teacher Roles

With the increase in distance education orientation, there will inevitably be differences in the roles of faculty members. In addition to presenting content, providing feedback and management, the teacher should be designed differently from the traditional classroom environment to create social learning environments that will increase interaction in e-learning environments (Gülbahar, 2020). According to Kember and Murphy (1990), faculties have essential responsibilities in adapting to faculty members accustomed to classical teaching methods, new skills and changing teaching roles. Rather than presenting information directly, faculties have to make arrangements to monitor and facilitate the work of geographically distant students (Bates, 1991).

The teacher should adopt a facilitating role between the learning resource and the student and act as a bridge between the content and the student (Beaudoin, 1990). The primary responsibility is on the teacher to eliminate the lack of communication caused by physical distances. As a result of the physical distance that exists in

distance education in student-teacher dialogues, learning, a social phenomenon, cannot be fully realized. In such cases, the perspective of individuals on distance education changes and distance education, which is seen as an alternative to face-to-face teaching, ends before it reaches its goal. To prevent such situations, the teacher should provide the necessary counselling service to the students who have difficulties using the system and learning difficulties. Saba and Shearer (1994) concluded in their study that the distance between the processes decreased with increased student control and dialogue by the teacher in distance education.

To keep his motivation alive in distance education, the teacher may have to make more effort than he spends in face-to-face teaching. A teacher, who can be cautious about student manipulations in face-to-face lessons, may be exposed to different manipulations with student groups of different genders, races and characteristics if they do not maintain quality communication to get to know their students in distance education. For this reason, the teacher should have information about the student profile by using high-level communication skills and should make their approach accordingly.

In addition, it is important in bilateral dialogues that the teacher indicates that he is aware of the student's social presence to increase their interest in the lesson. Studies show that student satisfaction is strongly associated with the student's perception of social presence (Gunawardena & Zittle, 1997). Social presence is defined as the degree to which an individual is felt as a "real person" in mediated communication (Short, Williams & Christie, 1976). In distance education, the teacher should be able to communicate effectively with students to make them feel that they care about their social existence.

Another way to make students feel their social presence in distance education is the on-site and timely feedback provided by the teacher to their students. According to Gaytan and McEwen, online assessment strategies include regularly having a variety of clearly-explained assignments and providing students with meaningful and timely feedback on the quality of their work. According to Çağıltay et al. (2001), feedback is divided into two as "approval feedback" and "information feedback". Confirmation feedback provides students with feedback on their progress in their work, while knowledge feedback includes an informational assessment. Howard (1987) defines student feedback as the most important course design and teaching component. Teachers can minimize communication problems between them and students by communicating their response policies and timelines for the e-mail they use for feedback to their students (Çağıltay et al., 2001).

New Student Roles

The responsibility of learning in distance education is entirely on the student. The student continues his education by saving time and asking for help from the teacher to provide the necessary support when he does

not understand. When the teacher cannot fully communicate with the student due to physical distance or technical problems, they cannot have sufficient information about the student's learning experience. Therefore, students are primarily responsible for their learning. Moore (1990) classifies student autonomy into three areas. These areas are; include the planning, implementation and evaluation of instruction. The highest degree of autonomy for the student is found in programs that allow the student to participate in all three aspects of teaching. It is seen that the students who are most successful in distance education situations tend to be independent, autonomous students who prefer to control their learning situations (Gunawardena & Zittle, 1997).

Institutional / Organizational Challenges

Peter (1971, 1983) argues that in the 20th century, distance education had a structure that was developed with organizational strategies focused on the shortening of geographical distances. This period was when distance education could be called the industrial period. This model aims to regulate educational processes to improve the economy. Garrison (2000) mentions that in the 21st century, more emphasis is placed on policies that will increase the functionality of the learning and teaching process rather than strategies that will remove structural constraints.

According to Gunawardena and Zittle (1997), many countries support new technologies by developing new media and information processing technologies, various group learning and information-gathering methods, and growing government telecommunications policies. However, there is an inequality of opportunity in countries with low economic welfare. Due to the difficulties experienced in accessing technology, deficiencies can be seen in accessing information. Gunawardena and Zittle (1997) group the institutional or organizational difficulties experienced in distance education under six headings. These; Access difficulties involving students' access to technologies to participate in the learning process, control difficulties including how much control the student has over the environment, interaction difficulty according to the degree of allowing student-teacher content, difficulties experienced with the interface that enables the learner to interact with students-content-teacher, traditional The difficulties of social presence in a social climate different from the classroom environment are the difficulties related to the symbolic form of the course content that is intended to be conveyed to the students.

The International Council for Distance Education (ICDE) has stated the difficulties that countries experience with distance education as follows (2010):

- Insufficient political will,
- Financial distress,

- Deficiencies in cooperation,
- Institutional reasons,
- Professional inadequacies,
- Problems with students,
- It is the lack of development of the technological infrastructure.

According to ICDE, one of the most important reasons why distance education is not at the desired level in countries is the deficiencies in policy development and the lack of political will to address these issues (Özkul & Aydın, 2020). Such a deficiency is also reflected in financial issues, and when the political will does not provide the expected financial support, the technological infrastructure cannot develop, and the access costs of students increase due to monetary issues. Thus, the insufficient support of the political will can be shown among the main reasons that blunt the existing potential towards distance education.

Suggestions for Overcoming the Difficulties in Distance Education

Under this title, solutions are offered to teachers, designers and policymakers to overcome the difficulties experienced in distance education.

Suggestions for Teachers

Many suggestions are presented below, accompanied by the efforts made for teachers and educators to have an efficient distance education process.

1. Teachers should develop technologically and get help from courses when necessary. Classroom teachers should improve themselves in using EBA effectively, increase communication with students and parents (Murray, 2009) and motivate students to be active in the distance education process (Kızıltaş & Özdemir, 2021).
2. According to Gunawardena & McIsaac (2013), teachers teaching with distance education should have the necessary competence in both the presentation of the content and the operation of technology.
3. Students who cannot interact effectively with the content and the teacher have difficulties in the distance education process. In parallel with this, the interactional distance between the students increases (Aktürk, 2020).
4. Teachers should have information about the student profile by using their high-level communication skills and should make their approach accordingly. In this way, he can be prepared for the manipulations he may encounter in the lesson, preventing unnecessary waste of time.

5. In bilateral dialogues, the teacher must show that he knows the student's social presence to increase their interest in the lesson. In distance education, the teacher should communicate effectively with the students to make them feel they care about their social existence. Experts should be helped in this regard (Attri, 2012).
6. Teachers should inform which communication platforms they use to communicate with their students. Hours, also called office hours, should not be clearly stated at which students can return.
7. As a measurement-evaluation method, teachers should adopt assessment methods that cover the whole period rather than instant assessment methods (Karatepe et al., 2020).
8. It may be important for teachers to follow the bulletin boards regularly and provide "information feedback" to students to detect deficiencies in learning. This can be likened to homework control in a traditional classroom setting. In this way, the teacher can quickly identify students with little interest in the lesson.
9. Teachers should increase students' social presence by using "confirmation feedback" to communicate with students in the lesson.
10. To create discussion environments in e-assessment environments, forum and chat activities, homework and wiki activities, and group workshops can be used for in-group interaction (Gülbahar, 2020).
11. A portfolio (product file), one of the evaluation approaches that support group work and creating a community of inquiry can also be used (Gülbahar, 2009).

Suggestions for Instructional Designers

To overcome the difficulties arising from the design of distance education, some suggestions are presented below.

1. Students access online course materials through the user interface, so the usefulness of the interface is important for an effective and efficient course. The interface should be usable and easily accessible in a way that allows students to send messages to educational content and academics and to be answered quickly by them (Keskin & Özer Kaya, 2020).
2. There should be consistency in the design of the web page used, and the information should be presented to the student. Website navigation can facilitate access to information (Çağıltay et al., 2001).
3. Considering the cognitive load institution, the visual images should be placed, and students should be prevented from experiencing unnecessary distractions during the lesson.
4. By diversifying the educational content, exciting and entertaining content should be created to prevent students from getting bored and distracted (Basaran et al., 2020).

5. Designs and software allowing instructors to prepare open-source materials should be used, and necessary support should be provided. Johnstone (2005) states that working with open-source materials increases instructor communication. Again, by designing and presenting the courses in an open-source way, the knowledge of experienced academics can be benefited from. Since the classes are open to everyone, academicians pay more attention to their courses (Kurşun et al., 2014).
6. Mobile devices have an excellent potential for performing both in-class and out-of-class activities with their features such as being accessible, portable and enabling instant communication (Saran, 2020). He knows that content can be developed to support students' mobile learning so that it can be facilitated for students to continue their education wherever there is an internet connection. Studies reveal that education with mobile devices positively affects learning (Thornton & Houser, 2005). To ensure efficiency in education with mobile devices, it is necessary to develop applications that allow content presentation and encourage student cooperation (Saran, 2020).
7. Distance education models can be designed as mixed to minimize the negativities experienced by students who do not have technical access and opportunities (Picciano, 2017).

Suggestions Policymakers Advice

In distance education, the duties and responsibilities of all stakeholders can be determined, and the disruptions experienced in the process can be minimized. This can be achieved by developing an effective policy and strategy. Policy developers have essential duties and responsibilities to prevent many problems in distance education. Policymakers should primarily lead the systemic change in education. The systemic change aims to create an education system that is more effective than the existing education system (Öncü, 2020). An education reform aiming at systemic change should be organized and hierarchical to include the entire education group within the system (Banathy, 1991). Recommendations are presented below to help policymakers make a systemic change in the distance education system.

1. Comprehensive and compulsory training on distance education should be given to teachers and students throughout the country. To increase interaction with students, the number of students in the classrooms should be reduced, equal use opportunities should be provided, and necessary technological support of similar quality for everyone should be provided to the students (Çardak & Güler, 2022).
2. One of the difficulties experienced in distance education is the insufficient knowledge of the personnel. The staff should provide full-time support to develop their online and multimedia teaching competencies (Aydın, 2003; Erfidan, 2019).
3. Professional development training should be made accessible to teachers at all times, regardless of time.

4. Professional development training should encourage teachers' team-based work with a collaborative approach (Tascı, 2006; Erfidan, 2019).
5. Platforms should be created to share teachers' strategies and methods in online learning, and teachers' participation should be supported (Çağıltay et al., 2001).
6. Teachers should be provided with necessary and sufficient information about the programs and interfaces used in distance education. For this purpose, qualified personnel who will provide technical support to teachers when required should be trained (Attri, 2012).
7. Strategic plans should be made, and policymakers should ensure implementation to disseminate distance education.
8. Each institution providing distance education should have a unique e-learning quality and education vision, and the steps to achieve this vision should be clearly stated and shared with all stakeholders involved in continuing education.
9. The development policy of the Open and Distance Education Research and Development Office (ARGE), which was established to achieve national and international recognition within the OEF, should be adopted by all distance education institutions, and they should include research and development activities to improve distance education within their structure.
10. E-certificate programs should support continuing professional development, including distance, time, qualifications and cost (Latchem et al., 2006).

Suggestions for Students

Although all conditions in distance education are improved, it is clear that individuals with self-regulation skills will not be able to gain efficiency from the learning process. Kokoç's (2019) study concluded that the variable with the highest effect on student engagement in online learning environments is self-regulation (attention control dimension). Therefore, the most important responsibility falls on the students. For the distance education process to be efficient and effective, students should be responsible for their learning and do their homework systematically, follow their lessons regularly and interact with teachers (Kızıltaş & Özdemir, 2021).

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Effects of Bangla Literature Courses on Students of English Department in Bangladesh

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Abstract

The article presents the effects of Bangla literature courses on students of the English language department in Bangladesh, and it investigates the impact of Bangla literature courses on students' understanding of literary ideas and their importance in the syllabus of the English department in Bangladesh. Bangla literature courses have been introduced in the syllabus of every English language department in Bangladesh. However, it cannot be effective in students' understanding of literature and languages without proper teaching practice. The teaching target focuses on teaching Bangla literature separately as a non-departmental course but does not show the purpose for students of the English language department. This paper discusses the position of Bangla literature courses in the teaching-learning setting of English departments. It identifies the implications of Bangla literature courses on students' overall understanding of literary ideas. Moreover, it examines the significance of Bangla literature courses in the syllabus of the English department. Both qualitative and quantitative methods are followed for conducting this research. This research represents data collected from three public and three private universities in Bangladesh. This study reveals that the students of the English language department can increase their understanding by experiencing progressive attitudes toward learning Bangla literature. Furthermore, it evaluates some difficulties faced by teachers and students in the context of Bangladeshi classrooms. Based on findings from collected data, the research offers some practical and pedagogical recommendations and some proposals at the end.

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Introduction

Bangla literature is one of the most prevailing non-departmental courses of the English departments in Bangladesh, so there is a marginalized approach given to the teaching and learning of Bangla literature in most teaching and learning contexts of the English department. To learn stylistics, most universities can use optional Bangla course that should be designed to give an intensive understanding of literary culture. Moreover, learning Bangla literature courses promotes students' analytical ability regarding literary devices. By considering this impact, English departments try to accommodate Bangla poetry, novels, drama, and short stories of prominent Bangla literature writers of all periods. However, this article reveals that learning outcomes of Bangla literature courses are not always correctly achieved in different teaching-learning contexts in Bangladesh. In most contexts, learners are unaware of the learning objectives of their Bangla literature learning process to study English literature and language. As a result, the Bangla literature course remains an irrelevant non-departmental component for many students. Moreover, in many Bangla literature classrooms teaching methods and techniques do not offer sufficient motivation and interest to generate students' active involvement in the learning process. Therefore, to make Bangla literature effective, teachers and learners should understand the learning goals of this course.

Problem Statement

Learning literature is one of the significant parts of the English department syllabus in Bangladesh. However, as English is a foreign language in Bangladesh, students find English literature difficult at the tertiary level. One of the main reasons for not having adequate knowledge of literary ideas is the way we approach communicative language teaching at school and college levels because, to ensure communication, we have almost eliminated literature from the pre-tertiary level syllabus. Moreover, there are minimum literary contents in the curriculum of mainstream educational institutions, but they are not taught with proper importance because literary items are not important for board examinations. As a result, literature remains unexplored for many learners at schools and college levels, so they need additional assistance when they enter tertiary-level English majors. However, students who are getting admission from English medium backgrounds have knowledge of academic literary components because they get chances to learn English literature at the pre-tertiary level. In fact, syllabus patterns of English departments of Bangladeshi universities do not reflect the connection with school and college levels English syllabuses of mainstream educational institutions. So, learners with Bangla medium backgrounds face difficulties with understanding literary ideas. Bangla literature is taught in almost every English department that can help learners to gain literary ideas, but the set of courses should be designed based on the needs and aptitude level of the learners.

Theoretical Framework

The theoretical framework of this study is formulated by combining concepts of decolonial approach and intercultural competence. Svensson (2015), in his research, theorizes the intercultural competence of Byrams that explains understanding regarding the culture of one's own and the target language and it helps students to understand different cultures. Moreover, it describes the efficiency of analyzing text by making relevance with one culture. In addition, this approach is relevant to the EFL context, where exposure to their own literature can assist learners in feeling engaged and joyful with literature learning. This study is also indebted to decolonial literary ideas that can complement the intercultural competence concept for this research as Espinosa (2021) explains the decolonial ideas for education curriculum and according to him, the decolonial approach can be a vital endeavor in education as education is an area of ideological imitation that can transmit conventionally obstinate paradigms and apply innovative paradigms of consciousness and compassion. It argues that we can apply foreign language either as the stick of coloniality or the supporter of revolution and alteration, so the decolonial approach changes the way learners see their own language and foreign language in traditional EFL contexts and curriculum changes by incorporating the decolonial option allows to avoid the conventional ideological burden and paves the way for paradigm changes. Similarly, decolonization assists innovative intercultural competence and exchange of cultural universality, and this approach combines techniques and mechanics of customary observation on own language and foreign language for exploring new pedagogical approaches that make a balance for foreign language learners.

Research Objectives

The objectives of the present study are:

1. To determine the position of Bangla literature courses in the teaching-learning setting of English departments.
2. To identify the implications of Bangla literature courses on students' overall understanding of literary ideas.
3. Examine the significance of Bangla literature courses in the syllabus of the English department.

Research Questions

Based on the requirements of the study, the research questions are:

1. To what extent is Bangla literature taught at the English department in Bangladesh?
2. How much does the course promote the literary understanding of students?
3. Does the syllabus offer appropriate learning outcomes for Bangla literature?

Literature Review

This section includes previous literature related to the research questions of this study.

Decolonial Approach

Akter&Siddiqua (2016) used mixed methods for finding the attitudes of both teachers and learners regarding the factor of decolonization of English study by incorporating Bangla literature, and their findings reflect that it is possible to accommodate native language literature in English departments of Bangladesh and the participants of this study responded that Bangla literature course is beneficial for learners and researchers recommend the application of proper teaching methodology at university level education. This study called the inclusion of a Bangla literature course in the English department a “crying need” because it claims that learners will not confine themselves to limited exposure to literary understanding if they learn native language literature along with English. Similarly, it can enhance the socio-cultural awareness of Bangladeshi students, as in this study, participants supported the integration of native literature courses in the English department. Casallas (2021), in his research at a Colombian University, reflects on English language teaching pedagogy where it is evident that in Colombian English language teaching, there are still influences of colonial ideas that prevent them from practicing innovative teaching concepts. This study claims that English language teaching should incorporate institutional discourse rather than depending on traditional approaches to teaching. According to this study, pedagogy is not fixed, so by considering ontological and epistemic challenges, teachers can use a decolonial approach to liberate teaching practices, so the teaching system can incorporate self-criticism where they can reflect inequality in educational settings. Similarly, this study suggests exploring Bangla literature based on our social and educational contexts where learners need a decolonial approach to learning literature by incorporating the experience of their own language that helps to become better learners.

Cultural Factors

Cruz (2010) describes that literature and culture confer perspectives to learners that help them to decode new literature and culture that do not share similarities with their personal contexts, and both literature and culture assist learners to make connections with the language they want to acquire. In short, this study suggests that the inclusion of literature and culture should follow pedagogic models so that students can develop a critical understanding of literary and cultural components. Billows (as cited in Maley 2001) explains that teaching literature within a cultural model enables students to understand and appreciate cultures and ideologies different from their own in time and space and to come to perceive traditions of thought, feeling, and artistic

features within the heritage the literature endows. Dodou (2021) focuses on the Swedish curriculum and its involvement with English literature. In Sweden, literary works in English are parts of the education system from primary to higher education, so this study tries to justify how English literature in non-native settings can be safeguarded, supportive and encouraging. This study explains English literature and intercultural learning to evaluate values and respect for self and cultural diversity that link to language learning. This study investigates curricula of different levels and shows the approach; for example, it explains cultural and contextual engagement with literature. It suggests the interdependence of different approaches at different levels of the curriculum. Moreover, Breen (2001) discusses a culture-based syllabus, which aims at the development of students' knowledge and content focuses on the systematic study of the people who use the language in terms of their society, history, and values, and communicative activities syllabus where the main goal is proficiency and contents promote the use of language in its socio-cultural context, both inside and outside the classroom.

English Literature in EFL Context

Divsar&Tahriri (2009) discuss that literature is obscure for learners who do not have proper knowledge of the English language, and for this reason, teaching literature for EFL learners is very challenging. Similarly, teaching literature for non-native learners is intricate for some reasons: for example, the rhetorical language of literature is different from conventional usage of language, and the difference between the meaning of literary texts and the social contexts of EFL students. This study mentions three stages of teaching literature: the linguistics phase, the content-culture phase, and the synthesis phase. Besides, this study suggests that the application of proper methods for teaching literature can help learners to get the target language properly and develop socio-cultural skills for literary analysis. Moreover, it also suggests that proper attention to the way of instruction for literature lessons creates innovative strategies for pedagogical outcomes-based teaching.

Bangladeshi Context

In addition, Karim & Zaman (2006) explain the reasons for the lack of literary ideas of the majority of students at the tertiary level and claim that by keeping in mind the demands of the present communicative language teaching method, the SSC and HSC English curriculum has been redesigned, and the teaching method has been changed. Moreover, in this updated curriculum and teaching method, literature receives no place, and functional English is the main learning goal for all teachers and learners at SSC and HSC levels. They also add that literature has been significantly eliminated because it is considered a 'luxury' for students of developing countries like Bangladesh. After that, they analyze that it is unfortunate that the communicative method, which has little or no literature component, does not help our students to acquire proper linguistic or

literary knowledge. For this reason, the majority of English department students come to the university level with no or minimum level of understanding of literary components. Besides, Chowdhury & Kabir (2014) mention the reference to the 1972 Constitution, which gave Bengali the status of the only national language and refer that the language of education in Bangladesh should be our native language Bangla. In higher education, we face a dilemma between Bangla and English language and our students remain weak in both languages. In their study, they also claim that in Bangladesh, we have 'persistent nationalistic favoritism towards Bengali' and assert that for higher education, we have an absence of a national language policy.

Bangla literature has similarities with English literature as Yasmin (2014) describes that English literature influences contents of bangle literature and satire and social comedy genre development in Bangla are indebted to Western influences. This research shows the influences of English on Bangla literature from several points of view, and according to this researcher, the impact of English literature on Bangla literature can be one of the major far-reaching and insightful impacts yet put forth by one language literature over another kind of literature. So, learning Bangla literature assists learners in dealing with literary techniques and mechanics of foreign literature. Moreover, literature is complex in the EFL context because to understand contents, learners need historical, political, and social knowledge, and not knowing the target language culture creates problems for foreign language learners (Okebe &Yashim,2017). For example, we also follow a new criticism approach in literature teaching, and our learners are also challenged because of their cultural, historical, and social unfamiliarity. So, knowledge of Bangla literature can help learners to understand how to interpret foreign literature from different contexts as literary knowledge of native language can be easily and successfully transferred to foreign language and literature settings.

However, it seems unconventional, as in Bangladesh. We have a traditional approach towards language learning; if we consider our learners' lack of motivation and enjoyment in literature classless, we should not ignore incorporating need-based approaches that can assist our learners as Widdowson (as cited in Noaman, 2013) explains that language teachers have the accountability to arbitrate adjustments in academic practice so that they can enhance the efficiency of language teaching (p.125). So we should not ignore incorporating our approach instead of copying from native literature learning context as we have English as a foreign language. Literary contents usually give ideas about experience, thoughts, outlook, and feeling that may possibly be conventional to an existent or creative component of the reader's understanding, and this creates it, to a great extent, easier for readers to communicate the understanding of experience with the familiarity of their surroundings that assist the education procedure. (Maley as cited in Bobkina& Dominguez, 2014). So having knowledge of Bangla literature provides background knowledge of how to approach EFL context literature.

Non-Bangladesh Context

Kumar (2020) explains that literature written in regional Indian languages faces challenges in teaching and learning because of English literature and mentions it as a predicament for learning. However, this research shows that learners bring literary competence from Hindi literature that helps them to analyze English literature better, but the presence of regional literature both in its original form and the translated version is facing colonial overshadow. Even though provincial languages are capable of performing dominant existence, the co-existence faces remoteness and inconsistency with each other. He mentions how reference materials from Indian languages and English language literature succeed in a fresh spirit that reveals the positive attitude of the students, but many teachers do not consider regional language presence appropriate to the educational contexts.

Teaching Techniques

Widdowson (as cited in Maley 2001) describes those techniques such as opinion, information gap, problem-solving, and role-play/simulation are effective techniques to enhance students' creative writing. When students come to literature classrooms, they are expected to know how to tackle literary analysis, but it is the reality that in many literature learning contexts, students have inadequate knowledge regarding how to grasp literary texts. For this reason, we find our literature learners are demotivated, and they acquire a kind of pseudo-literary competence. Similarly, for learning literary analysis, they memorized ideas like parrots, and these ideas are not their own because they collect ideas from received opinions. However, teachers can make students familiar with literature progressively and can sensitize them to the literary ideas that endow literature with special features, and it will provide students with the necessary literary skills which are needed for particular literary works.

Vuckovic (2015) explains that understanding terms related to literature plays an essential part in interpreting texts because understanding terms provides reading skills for literature and creates comprehension of the poetic function of any language. This study reviews the ideas that for taking the experience of literature, there is no getting away from literary terms because literary works function within the structure of literary terms and ideas. Understanding literary terms are necessary for a classroom environment where learners can relate experience and understanding, and thus it can be enjoyable for learners. Teaching literature should not forget the aesthetic distance and implied reader; otherwise, readers will not be able to interact with the text, which requires literary-theoretical acquisition. If learners do not acquire literary features, they will be unable to acquire adequate knowledge about literature.

Method

This research is mixed methods in nature because it requires the integration of both qualitative and quantitative research procedures to deliver accuracy of data production and analysis. The target group was undergraduate English department students from three public and three private universities; both public and private universities were included to get holistic ideas from both streams. Purposive random sampling was used, and both rural and urban areas were covered to produce data crosschecking from both sources.

This study considers the extent to which Bangla literature is taught, and the data was collected through questionnaires, interviews, focus group discussion, and syllabus analysis. The questionnaire was mock-tested by teachers and students, and a total of fifty students participated in the questionnaire. The interview was face-to-face, and a total of ten teachers participated in the interview. Focus group discussion was used to get high face validity, and a total of twelve students (each six) participated in two focus group discussions. A total of seven syllabuses were analyzed to get reliable comparisons from both public and private universities. Six questions were used in the questionnaire, and the Likert scale was used to design and analyze the questionnaire. A total of five questions were asked for teachers' interviews, and both structured and unstructured processes were incorporated.

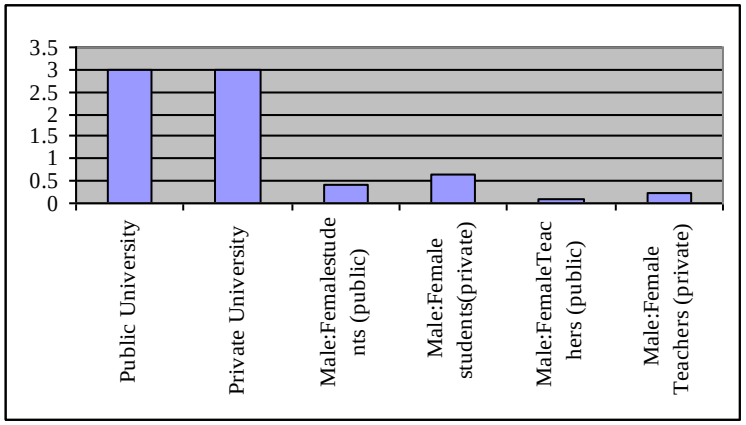

Chart 1. Sample of the Study

Results

Charts 2, 3 & 4 show the results of the students' questionnaire, and it represents the percentages and means for respondents' responses according to the Likert scale.

ITEM 01 Importance of Bangla literature courses

ITEM 02 Literary analytical ability

ITEM 03 Organization in the syllabus

ITEM 04 Attitude toward learning

ITEM 05 Awareness of the learning outcomes

ITEM 06 Enjoyment in the classroom

Strongly Agree (5), Agree (4), Neutral (3), Disagree (2), Strongly Disagree (1)

Results of Students' Questionnaire

Firstly, in item 01, the importance of Bangla literature courses in the English department is represented, and the analysis shows that the majority (54% strongly agreed and 22% agreed) of respondents acknowledged that Bangla literature course is essential for the English department students and this item has mean score 4.24 which is highest among other items. However, item 2 shows contradictory results where the majority (44%) were neutral with the statement that the Bangla literature course is improving students' literary analytical ability, which shows that learners are not aware of the learning impact of this course. After that, in item 03, the majority (18%) strongly disagreed, and 26% disagreed) responded that the Bangla literature course is not properly organized in the syllabus of the English department. Similarly, in item 5, the majority (38%) disagreed, (and 20%) strongly disagreed that learners are aware of the learning outcomes of Bangla literature courses.

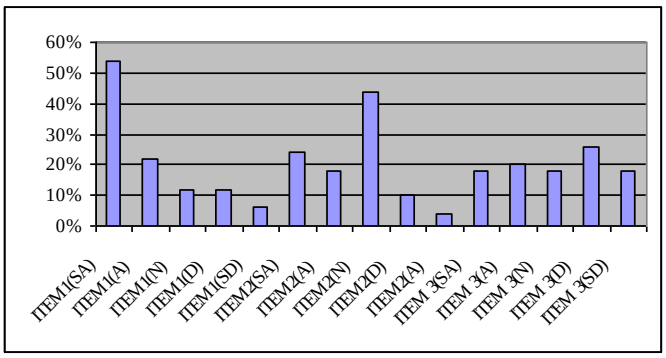

Chart 2. Questionnaire (I)

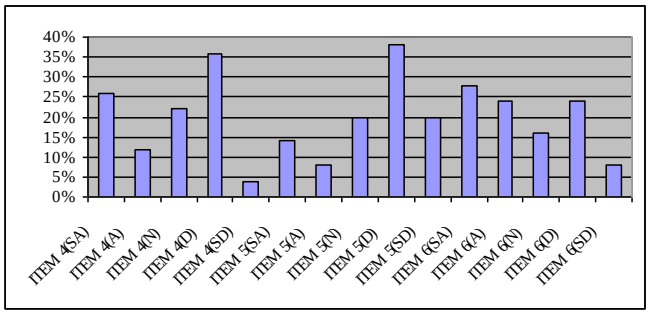

Chart 3. Questionnaire (II)

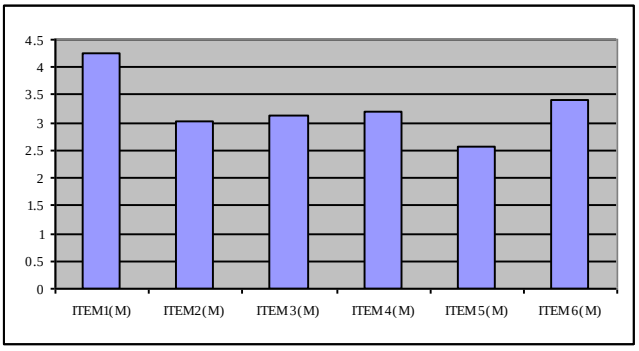

Chart 4. Questionnaire (III)

After that, in the results of item 4, the majority (36%) believed that they do not show a caring attitude towards learning Bangla literature courses, but it is noticeable that (26%) strongly agreed with the same statement. Finally, in item 6, the majority (28%) responded that they are enjoying Bangla literature courses in the classroom, and (24%) disagreed with the same statement.

Results of the Teachers' Interview

The first question for teachers was on the objectives of Bangla literature courses for English department students, and in answer, 6 (60%) said that learning goals are properly achieved because learners acquire literary interpretation, while 1 (10%) teacher emphasized the inclusion of more literature courses. After that, teachers were interviewed on a question regarding the level of literary analytical skill at the entry level of students of the English department, and in response, 1(10%) said that since students do not get a chance to study English literature at schools and college level, they struggle with literary analysis.

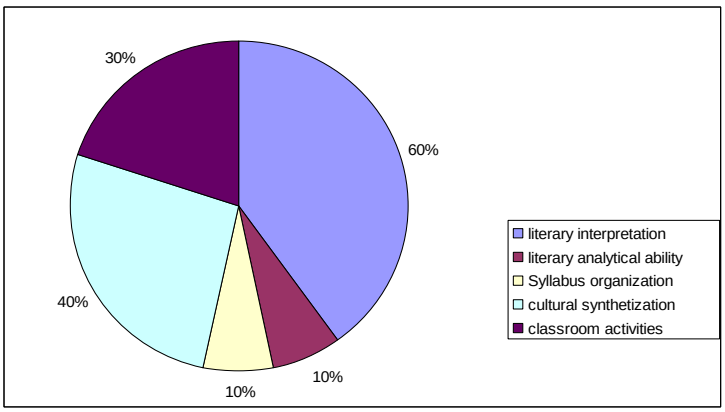

Chart 5.Teachers' Interview

In response to the third question, 1 (10%) teacher responded that the Bangla literature course can incorporate more texts in the syllabus. In addition, 4(40%) teachers responded that Bangla literature courses have an impact on the cultural synthetization of the English department students. Finally, 4(40%) teachers replied that Bangla literature courses have value in the learning process of students, and 3(30%) added that interesting classroom activities could be incorporated to make students engaged in the learning process.

Results of the Focus Group Discussion

For focus group discussion total of twelve students were selected, and they completed Bangla literature courses in previous semesters. At first, participants were introduced to the topic, and it took thirty-five minutes for discussion and opinions.

Outcomes and Relevance

Firstly, the question was asked regarding learning outcomes and the relevance of Bangla literature courses in their syllabus; seven students responded that they sometimes found Bangla courses very irrelevant to their syllabus. Two of them agreed that Bangla poetry, novels, and plays gradually made them interested in studying literature.

Benefits

When they were asked questions regarding the advantages of having Bangla literature courses in their syllabus then, two of them added that they benefitted from Bangla literature courses because it helped them to analyze literary ideas. Moreover, four of them said that they understood character analysis from Bangla literature courses, and later they applied it to English literature courses. Besides, one of them responded that it helps her to understand the symbolism. In addition, two students were from mainstream English medium backgrounds, and they responded that Bangla literature is enriched with alluring details that are not far from English literature, and they both have similarities, and they pointed out that the only difference is the language they are expressed in. They also added that acquiring knowledge of Bangla literature draws various impacts on students, and the significant impacts are they learn the basic of Bangla literature, and they can find the similarities between Bangla and English literature. They also said that learning is never a loss, and thus, gaining knowledge of Bangla literature while studying English at the tertiary level is a great motive to know the language better. Moreover, students mentioned that they could compare two literary traditions easily after completion of this course.

Challenges

They were asked to mention some problems that they faced in Bangla literature courses. Three of them explained that for a student who does not have enough knowledge of Bangla literature from an early stage, it is quite complex for them to grasp ideas, and one of the students was from a North American school background. He said sometimes he faces problems regarding writing Bangla because of a lack of practice.

Results of the Syllabus Analysis

This part explains the findings from the analysis of different syllabuses.

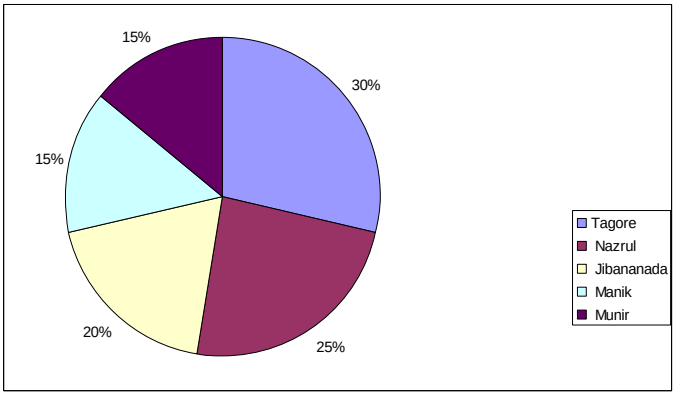

Chart 6.Syllabus Analysis

Contents

Firstly, Bangla literature syllabuses in the English department of different universities share similarities and differences. In fact, the similarities are they mainly focus on Rabindranath Tagore (30%), Kazi Nazrul Islam (25%), Jibananda Das (20%), Manik Bandopadhyay(15%), Munir Chowdhury(15%) of the entire contents of the syllabus. Syllabuses of these universities also cover Akteruzzaman Elias, Bibhutibhushan Bandyopadhyay, and other writers.

Pattern

It is noticeable that different universities offer this course in different semesters, and this course is offered as an optional course in public universities. Moreover, in the syllabus of the University of Dhaka, there were two Bangla literature courses, and the time duration was two years, but in the existing syllabus, there is one literature course for six months. Furthermore, both Jahangirnagar and DhakaUniversity offer this course in

the first semester, and this study reveals that the course objectives can be properly achieved if this course is taught at the beginning of the semester process because students need exposure to literary devices and analysis process in the native language.

Objectives and Outcomes

In the syllabus of Jahangirnagar University, course objectives are mentioned for students' understanding of the course, and it states that this course samples the rich tradition of Bangla literature. Besides, it includes both the formal study of literary devices and the critical reading of selected poems, plays, novels, and short stories. The objective is to underscore the uniqueness and immense varieties of Bangla literature as well as to explore if and how Bangla literature has been influenced by Western and English literature and philosophy. They also offer literary devices in Bangla which promote students' understanding of complex literary components at the early stage of their university level. In contrast, many syllabuses of private universities offer this course at an advanced level of the semester, and they do not provide clarity of learning outcomes for students' understanding of the relevance between Bangla literature and English literature.

Discussion

This section describes the findings and analysis of this study.

Position of Bangla Literature

From the above study, it is evident that the purpose and learning objectives of learning literature in the English department are not clear among students, so this indicates that learning outcomes and objectives should be properly disseminated among students at the beginning of the semester. Moreover, private universities can update their Bangla literature syllabus to make it more effective, as it can help students to enrich their literary criticism and develop literary sensitivity.

Literary Understanding

Bangladeshi students are challenged by the cultural remoteness of the text, so studying Bangla literature courses can enhance literary and cultural orientation towards studying literature. Similarly, the Bangla literature course inspires students to understand the literary qualities of the Bangla language; for this reason, more courses can be incorporated into the syllabus of the English department, and more literary criticism books can be added for further reading. In addition, different classroom activities can be incorporated to

promote students' engagement and interest, and a Bangla literature course can be offered at the beginning of the semester to offer students parallel notions of English and Bangla literary ideas.

Syllabus and Learning Outcomes

From the analysis of different syllabuses in terms of their clarity of stated learning outcomes, the inclusion of literary devices, literary texts, and position in the syllabus, it is noticeable that private universities can improve their syllabus organization by following methods and techniques used by public universities. However, it is found that students coming from diverse backgrounds in English departments have different levels of needs for literary studies, so courses can be designed and offered based on the needs of the learners. For example, Bangla literature courses can be offered as optional non-credit courses so that teachers can advise learners to take Bangla literature courses based on their needs assessment.

Cultural Factors

Findings from the students' questionnaire reveal that students enjoy Bangla literature course as it connects their personal cultural experiences, and teachers also consider that Bangla literature courses have an impact on the cultural correlation of the English department students.

Decolonial Approach

This study shows that there are positive prospects for a decolonial approach in English as a foreign language setting because both teachers and students acknowledge the successful existence of local language and culture in the English department that enhances the literary and intercultural competence in the literature learning process. Moreover, FGD shows that learners do not show a conventional attitude toward their literary study as they consider that the inclusion of Bangla literature has a better impact on the learning experience as learners feel the connection between Bangla and English literary traditions.

Conclusion

Students of English at the tertiary level of education are required to take a course on Bangla literature. While at first glance it may seem counterintuitive, the requirement is very much a deliberate effort to guide the students through a steep learning curve associated with studying literature by exposing them to the key literary elements. Therefore, it is obvious that a course on Bangla literature is the essential first step for

students of the English department at the tertiary level of education so that they get a grasp of these key elements of literature through their native languages.

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