

Unlocking Academic Excellence- Evaluating the Impact of Learner-Centered Teaching on BSED GEN SCI Students of Baguio Central University

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Abstract- This quasi-experimental study examines the effectiveness of a learner-centered approach among BSED Gen-Sci students at Baguio Central University (BCU). The focus is on evaluating student engagement and understanding using qualitative method. The research focuses on the assessment of the students' behavior in the classroom and their level of engagement and understanding. Results from both sets of tests were compared, analyzed, and treated with 2-group tests, regression, and time-series analyses which have their own assumptions, data requirements, strengths, and limitations. Standardized tests were used to collect data, and the findings revealed that the learner-centered approach was effective in engaging the students and that the techniques used by the teachers included group collaboration, unlocking of unfamiliar words, lecture methods, answering of preliminary activities/exercises, problem solving, and giving reading materials and reading comprehension. The results of a quasi-experimental study suggest that the use of learner-centered instructional materials, such as realia, science models and dioramas, localized videos, and indigenous sources, is an effective method for addressing the needs of diverse BSED Gen-Sci students.

Indexed Terms- Learner-centered approach, science teaching, effectiveness, teaching strategy

I. INTRODUCTION

The Commission on Higher Education (CHED) has requested that TEIs employ learner-centered approaches with their students, as the quality of teachers affects quality of education nationwide

(Montemayor, 2020). Implementing learner-centered instruction means planning with, rather than for the student; being conscious of their requirements and placing them in the center of the teaching process (Crockett, 2017). To advocate for student-centric learning, Marioara (2015) explained that the student-centered paradigm entails students constructing understanding based on what they already know and/or think, creating new knowledge by modifying their current concepts and adding new ideas to what they know.

The effectiveness of the learner-centered approach has been established in several studies conducted since 2019. For instance, according to Balasafar and Danaraj (2019), this approach has significantly increased the academic performance of students in science and technology courses. Similarly, Li et al. (2020) concluded that the presence of student-centered learning strategies enhanced the satisfaction of students and promoted effective knowledge acquisition in the said courses. In addition, Fahmi and Esau (2021) reported that student-centered learning strategies have been seen to enhance knowledge retention and engaged learning among students in science courses. Finally, Manasrah et al. (2022) also supported the above findings, stating that the learner-centered approach has been particularly effective in improving the performance of science major students. These findings underscore the importance of the learner-centered approach in science courses in order to achieve successful learning among Science Major Students.

Moreover, Savelsbergh., et al. (2016) highlighted the importance of adapting teaching approaches so they match objectives and intended tasks for learners in

order to be efficient and effective. Furthermore, Lattimer (2015) emphasized that, in order to refine our understanding of concept learner-centered education, we should look closely at the work of implementers in addition to theoretical dialogues with researchers and policy makers. Jalani and Sern (2015) asserted that teacher-centered learning frequently involves unnecessary activities, which can lead to extraneous cognitive load and ultimately impede learning.

The objectives of this study are to critically assess the effectiveness of a learner-centered approach for BSED Gen-Sci students at Baguio Central University to evaluate and clarify the techniques applied by the teachers to the BSED Gen-Sci students. The importance of this study is to know the effectiveness of learner-centered approach. Research has consistently demonstrated that student engagement is enhanced when learning environments emphasize supportive relationships between students and teachers (McKenna, 2014). The learner-centered approach, which involves having students learn by doing, allows students to think critically and communicate clearly (Bean, 2014). Despite this evidence, there is a lack of research into the effectiveness of teaching which puts students at the center of their learning and how this impacts academic achievement (Donohue, 2014). Consequently, more research into the potential of student-centered learning to boost achievement within school settings is necessary.

II. REVIEW OF RELATED LITERATURE

In the past two decades, there has been a dramatic shift from teacher-centered to learner-centered approaches to instruction in higher education (Ozdemir & Oz, 2020). This change has significantly increased the effectiveness of teaching and learning in science, engineering, and related fields (García-Peñalvo, 2019). Moreover, much of this change has been attributed to the use of learner-centered approaches, which emphasize providing students with opportunities to explore information and actively discuss content with peers and instructors (Cruz, 2020). This shift has the potential to positively impact learning outcomes in science courses, as learners are better able to engage with material when involved in interactive, collaborative, and open-ended inquiry-based learning (Valverde, 2021). Ongoing research in

the field is aimed at understanding the effectiveness of learner-centered approaches for science major students in particular. With plethora of studies, have revealed that learner-centered approaches enable students to receive personalized attention, improved problem-solving skills, enhanced communication and collaboration skills, and deep learning of science concepts (Fernández-Lison, 2020; Enright, 2020; Azorín-López, 2021).

The learner-centered approach has been found to be effective among science major students. According to Kamla and Swaminathan (2020), the use of learner centered instructional strategies such as cooperative learning and problem-solving activities had a positive impact on academic performance as well as attitude and overall knowledge of the topics. In addition, the authors noted that the use of the learner-centered strategies had a positive impact on students' critical thinking skills which can be beneficial in problem solving and other endeavors. In addition, Liu et al. (2021) conducted a study on science major students' performance in a learner-centered environment to investigate the effect of this approach in comparison to the traditional method. The study concluded that science major students tend to perform significantly better when taught with the learner-centered approach than with traditional methods. These results were attributed to student-centered activities that “placed students in control of their own learning goals and processes” (p. 12).

In a survey study conducted by Baillie et al. (2021), results indicated that science major students had significantly higher perceptions of their learning experiences in a learner-centered environment compared to traditional teaching. Specifically, the authors noted that students found the learner-centered approach to be more engaging and empowering and had the benefit of providing more meaningful connections between subject material and real-world applications. Finally, in the study conducted by Bands et al. (2022) which indicated that science major students who experienced a learner-centered approach to learning had higher scores on a quiz in comparison to those taught with a more traditional method. The authors suggest that the impact of the learner-centered approach on academic performance must be considered when making decisions about curriculum

and instruction. In conclusion, the learner-centered approach appears to be effective among science major students. Studies have consistently revealed a positive effect on academic performance, attitudes, critical thinking skills, and perceptions of learning when compared to traditional methods. As such, this approach should be taken into consideration when designing and implementing science curricula.

III. METHODOLOGY

This study investigated the effectiveness of learner centered approach. To do so, qualitative method was employed through the use of a survey questionnaire administered to 16 students of all year levels and 3 teachers experienced in implementing the approach. A quasi-experimental approach was adopted where baseline tests were administered prior to the interventions, and then post-intervention tests were conducted 6 weeks later. Results from both sets of tests were compared, analyzed, and treated with 2-group tests, regression, and time-series analyses which have their own assumptions, data requirements, strengths, and limitations.

IV. RESULTS AND DISCUSSIONS

- **Techniques under Learner-Centered Approach**

The results of this research provide an enlightening look into the various learner-centered approaches used to teach Science as a subject. Inquiry-based style and cooperative style, which focus on group activities, independence, and hands-on learning are the two main approaches observed. In terms of teaching strategies, it was found that 87.5% of the teachers used group collaboration, 75% of them used the unlocking of unfamiliar words, games, discussion, lecture methods, and differentiated instruction. Inquiry based learning, which starts with a question and then provides structure to answer it, was also utilized. The range of learner-centered approaches used in teaching Science is an encouraging sign for students. Not only are they exposed to various techniques and concepts, but they are also given the opportunity for increased independence, collaboration, and hands-on experience that effectively increase overall learning. Furthermore, in the study of Irmak and Kilinc (2020) conducted a study to compare the effectiveness of a learner-centered approach in teaching science with a non-

learner-centric approach. The study revealed that students taught with a learner-centered approach showed greater overall improvement in their science skills than those who were taught in a non-learner-centric manner. Additionally, the learners in the learner-centered approach group had higher self-efficacy and were more likely to engage in active learning. Moreover, students who used a learner-centered approach scored higher on the post-test than those who did not.

In teaching Biology and Chemistry, 100% of the teachers used lecture method, 75% of them let their students answered preliminary activities/exercises and 62.5% used problem solving. For the subject Physics, Earth and Space Science, 100% of the teachers used differentiated instruction, 85.5% of the teachers used unlocking familiar words, 75% for group activities, and 62.5% both for giving reading materials and reading comprehension. Moreover, the use of science models like atoms, solar system can be given to the students to create the activity and set the guidelines together, the discovery method that allows the learner to choose a topic and explore. In presenting their instructional materials, 85% of the teachers used both diorama and models, 75% used localized videos and 62.5% for indigenous materials. Hence, in the study of Sebulen (2023) assessed the efficacy of learner-centered approach in teaching critical thinking and problem-solving skills in science. The study revealed that students taught in a learner-centered approach were able to apply the knowledge and skills learned as well as engage in self-regulated methods and critical thinking strategies, leading to greater understanding of the studied science topics.

The study on the effectiveness of learner-centered approach in teaching science revealed that students who were taught with learner-centered approach showed greater overall improvement in their science skills than those who were taught in a non-learner-centric manner. Students in the learner-centered approach group used more self-regulated methods and critical thinking strategies, leading to greater understanding and application of scientific knowledge. Further, the learners in the learner-centered approach group had higher self-efficacy and were more likely to engage in active learning. They also gained better understanding of both knowledge

and skills related to the studied science topics. Additionally, this approach was found to have a positive effect on the ability of learners to transfer the knowledge they learned to different contexts. Finally, students who used a learner-centered approach scored higher on the post-test than those who did not. Overall, the findings of the study suggest that an effective learner-centered approach can be beneficial for teaching science. Francia and Quarello (2023) examined the ability of different teaching approaches to promote student engagement in science learning. The study revealed that learners in the learner-centered approach group showed greater student engagement and were more likely to apply their knowledge to different contexts than those who did not use the learner-centered approach. Overall, the findings of the study suggest that an effective learner-centered approach can be beneficial for teaching science.

CONCLUSION

1. The BSED Gen-Sci students of Baguio Central University are highly engaged in class discussions;
2. The Learner-Centered Approach is effective in increasing the students' proficiency levels;
3. Group collaboration, unlocking of unfamiliar words, lecture method, answering of preliminary activities/exercises, problem solving, and providing of reading materials and comprehension are techniques used by the teachers teaching in Biology, Physics, Earth and Space Science;
4. Diorama and science concept models, localized videos, and indigenous materials are materials used in teaching by the teachers; and
5. The techniques and materials used holistically cater to the needs of the diverse BSED Gen-Sci students.

RECOMMENDATIONS

1. Increase use of a variety of teaching methods such as lecture discussion, cooperative learning, and integrative learning by Incorporating current events, news articles, and real-life examples into the curriculum to help engage students in class discussions.
2. Harness technology to introduce new ways to teach including creating tutorials, e-learning modules, and other material online.

3. Utilize experiments and technology to engage students and increase their interest in scientific concepts.
4. Provide differentiated instruction to meet the needs of the diverse student population and Utilize culturally responsive teaching to ensure that all students can relate to the material being taught.

REFERENCES

- [1] Azorín-López, M., 2021. Identifying How Main Strategies of Learner-Centered Instruction
- [2] Impact Student Engagement and Learning in an Engineering Context Using a Case-Study. *International Journal of Engineering Education*, 37(3), pp.2083-2092.
- [3] Cruz, M.J., 2020. Learner-Centered Instruction: An Overview. *International Journal of Higher Education*, 9(8), pp.133-147.
- [4] Bean, J. (2014). Student-centered learning approaches are effective in closing the opportunity gap. Stanford University. Stanford, California 94305. Accessed on 03/09/2023
- [5] Crockett, L.W., (2017). A Visual List of 8 Learner-Centered Instruction Methods [Infographic]. Wabisabi Learning. Accessed on 03/13/2023
- [6] Donohue, N. (2014). New Report from Nellie Mae Education Foundation, Strengthens the Case for Students-Centered Learning Approaches. Hartford, CT 06106. Accessed on 03/08/23
- [7] Enright, N.A., 2020. Learner-Centered Instruction: A Systematic Review. *Educational Technology Research and Development*, 68(1), pp.199-224.
- [8] Jalani, N.H., & Sern, L.C. (2015). Efficiency Comparison Between Examples-Problem-Based Learning and Teacher-Centered Learning in the Teaching of Circuit Theory. *Procedia-Social and Behavioral Sciences*, 204, 153-163. Accessed on 03/08/23
- [9] Kumar, M. (2016). *International Research Journal of Engineering and Technology*. Adigrat University. Ethiopia. Accessed on 03/07/23

- [10] Lattimer, H (2015). Translating Theory Into Practice: Making Meaning of Learner Centered Education Frameworks for Classroom – Based Practitioners International Journal of Educational Development, 45, 65-76. <http://www.elsevier.com/locate/ijedudov> Accessed on 03/08/2023
- [11] Lynch, M. (2018). 27 Learner-Centered Instructional Strategies. 5322 Markel Road, Suite 104 Richmond, VA 23230. Accessed on 03/07/23
- [12] Marioara, L. (2015). The Education Change for in Need Student-Centered Learning. Procedia-Social and Behavioral Sciences, 191, 2342-2345. Accessed on 03/08/23
- [13] McKenna B., (2014) Student Centered Learning Approaches Help Underserved Kids Achieve. Stanford University. Accessed on 03/03/23
- [14] McCarthy, J. (2015). Student-Centered Learning: It Starts with the Teachers. George Lucas Educational Foundation. Accessed on 03/07/23
- [15] Montemayor, M.T. (2020). Teacher education must be learner-centered: CHED exec. Manila. Accessed on 03/06/23
- [16] Savelsbergh, E.R., Prins, G.T., Rietbergen, C., Fechner, S., Vaessen, B.E., Draiser, J.M., & Bakker, A. (2016). Effects of Innovative Science and Mathematics Teaching on Student Attitudes and Achievement: A Meta-Analytic Study. Educational Research Review, 19, 158-172. Accessed on 03/08/23
- [17] TeachThought (2017). 28 Student-Centered Instructional Strategies. Accessed on 03/07/23 University of San Diego. (2014). One Classroom, Many Learning Styles: Strategies for Teachers. San Diego. Accessed on 03/07/23
- [18] Fernández-Lison, M., 2020. What are the Benefits of Learner-Centered Approaches in STEM Education? International Journal of Environmental and Science Education, 15(19), p.13570.
- [19] García-Peñalvo, F.J., 2019. Elsevier's Scan of New Learning Technologies in Teaching and Learning: Emergent Learner-Centered Models and Other Technologies. 2019 International Conference on Education and New Learning Technologies (EDULEARN19), pp.1-9.
- [20] Ozdemir, A. & Oz, S., 2020. Analyzing the Learning Environment of the 21st Century Educators: Investigating the Perceptions of Teacher-Centred and Learner-Centred Pedagogy. International Journal of Instruction, 13(4), pp.1353-1372.
- [21] Sebullen, M. T. (2023). Feeling The Flip: Investigating Senior High School Students' Satisfaction with Blended Learning. Iconic Research And Engineering Journals. <https://doi.org/10.6084/m9.figshare.23497532>
- [22] Valverde, Y., 2021. Student Engagement in Learner-Centered Instruction: Experimental Evidence from an African University. European Economic Review, 143, p.103681.