

**EFFECTIVE USE OF LEARNER CENTERED METHOD  
IN TEACHING AND LEARNING BIOLOGY IN UPPER  
SECONDARY SCHOOLS OF RUSIZI DISTRICT**

**USENGIMANA Gerard**

University of Rwanda

**HABIYAREMYE Jean de Dieu**

University of Rwanda

ISSN 2277-7733

Volume 12 Issue 3,

December 2023

**Abstract**

*This paper examined the effective use of learner centered method in teaching and learning biology in upper secondary schools of Rusizi district. The current paper gathered qualitative and quantitative data using questionnaires, interview guides and observation. A descriptive research design has been used. Quantitative data was presented, analyzed and interpreted using the Statistical Package for Social Sciences (SPSS). Qualitative data was presented and analyzed in form of extracts, explanations and interpretations. In addition this study was guided by the Constructivism Learning Theory. Although previous researchers revealed that the usage of learner-centered approach plays a great role in biology teaching and learning, the findings of the current paper evidenced that learner-centered approach is not used effectively in upper secondary schools of Rusizi district in Rwanda due to limited time, scarcity of teaching and learning resources, teachers' heavy workload, lack of knowledge about learner-centered instruction, biology subject culture, teachers' attitude toward learner-centered instruction, lack of funding and limited ability to afford adequate resources for biology teaching and learning. Furthermore, the current paper identifies strategies that can be used to alleviate the challenges associated to the effective use of learner-centered method in teaching and learning biology within upper secondary schools of Rusizi district which are increasing teacher training and professional development about using learner centered method, availing enough resources for biology teaching and learning, teachers' workload alignment, integrating technology in biology teaching and learning as well as the implementation of CBC.*

**Keywords:** *Learner-Centered Approach, Teaching and Learning Biology, Uper Secondary Schools*

Learner-centered teaching and learning is an approach that puts the learner in the center of a teaching and learning process (Fall, 1999). The learner hence becomes an active participant in the learning process. This is opposite to the traditional teacher-centered approach where the student is a passive recipient in the learning process and is viewed as an empty vessel to be filled with knowledge supposed to be provided by the teacher (Cottel & Millis, 1993; Bonner, 1999). In learner-centered teaching and learning, the role of a teacher consists of creating a suitable learning environment for the learners, mainly by constructing authentic and real life tasks that increases learner's involvement and participation (Weimer, 2002). Learner-centered teaching, therefore, allows teachers to evaluate learners according to criteria that are important in actual performance for their future instead of memorization of concepts (Wiggins, 1989).

## ***LEARNER CENTERED METHOD IN TEACHING AND LEARNING***

The use of learner-centered methods in teaching and learning has gained worldwide approval due to its immense benefits which includes enhanced content retention by the student and promoted critical thinking as well as creativity (Maxwell, 1998; Slavin, 1990). All the learners benefit from this effective instruction no matter how diverse their learning needs are (Stuart, 1997). This is because motivation and actual learning increase as the learners have an interest in their own learning and are treated as co-creators in the learning process (McCombs & Whistler, 1997). During biology teaching and learning, like in any other subject, learner-centered method places the learner at the center of Education while the instructor assumes responsibility for facilitating and guiding the students' education (Tackers & Hardman, 2001; Majanga, Nasanga, and Sylvia, 2011).

The Government of Rwanda has also invested a lot in teachers' in-service training to improve quality and relevance of Education (Ogwel&Kisangi, 2009). Here, improvement is being done step by step including introduction of practical national exams in science subjects such as biology and the change of curriculum from knowledge-based curriculum (KBC) to competence-based curriculum (CBC). Furthermore, the Government of Rwanda has organized many teachers' trainings on learner-centered method and many teachers are claiming that they are already applying this approach in their teaching.

However, The survey conducted by Africa Institute for Mathematical Sciences (2018) indicates that from 2013-2017, 44% of candidates in Rusizi district failed Biology in Rwanda National Examinations because only 16% of candidates managed to score between grade 1 and 4.

In addition, the study conducted Ndayambaje, Bikorimana, & Nsanganwimana (2021) reveals that students' academic performance in biology is poor in secondary schools of Rwanda during the year 2017 to 2019. This implies a gap to effectively apply learner-centered methods in teaching and learning biology within the district. For this reason, the current paper explored the status of using learner-centered method in teaching and learning biology within secondary schools of Rusizi district and factors and strategies to alleviate the challenges that both teachers and students are facing while applying this new teaching and learning approach.

### **Material and Methods**

The objectives of this paper are: to explore the status of use of the learner-centered method in teaching and learning biology within advanced level of secondary schools of Rusizi district, in Rwanda; to investigate factors that may be hindering effective use of learner-centered method in teaching and learning biology within advanced level of secondary schools of Rusizi district and to explore strategies that can be used to alleviate the challenges associated to the effective use of learner-centered method in teaching and learning biology within advanced level of secondary schools of Rusizi district.

## ***LEARNER CENTERED METHOD IN TEACHING AND LEARNING***

In order to accomplish these objectives, the current study collected data using questionnaires, interview guides, documentation and observation. A descriptive research design has been used. Quantitative data was analyzed by the use of the Statistical Package for Social Sciences (SPSS) while qualitative data has been presented and analyzed using extracts and explanations.

The research population comprises biology students from upper secondary schools in Rusizi district, along with teachers and school administrators, including Head Teachers and Deputy Head Teachers. A total of 75 respondents were selected for the study, including 63 students, 4 biology teachers, 4 Deputy Head Teachers responsible for Studies (DOSs), and 4 Head Teachers. The selection process employed a combination of simple random sampling, stratified sampling, and purposive sampling based on respondent categories.

In addition, primary data were collected using questionnaires, interview guides and observation while secondary data were collected through document analysis about effective use of learner centered method in teaching and learning biology.

Furthermore, the paper was guided by Jean Piaget's Constructivism Theory (Piaget, 1967) which states that individuals try to make sense of all information they perceive when this information interacts with their prior knowledge.

As a result, the individuals construct their own meaning of the received information based on their knowledge. Piaget called this prior knowledge Schema (Cakir, 2008). In this regards, Naylor and Keogh (1999) define learning as an active process by which learners construct meaning by linking new ideas with their existing knowledge. The central principle is that learners can only make sense of new situations in terms of their existing understanding.

Lev Vygotsky (1987) held a different opinion on the impact the social-cultural environment has on the learning process of the child. He argued that for effective learning to take place, the learning environment should involve guided interactions that permit children to reflect on inconsistency and change their perceptions through communication. To conclude, we can say that effective learning is based on students' prior knowledge and their interaction with learning environment. The two parameters incite students to actively participate in the whole learning process. This theory was quite useful in the achievements of the current paper's objectives.

### **Results and Discussion**

The Status of Use of Learner Centered Method in Teaching and Learning Biology in Upper Level of Rusizi District Secondary Schools: The current researcher collected quantitative data about students' views on the importance of learner-centered method in biology teaching and learning. Therefore, the table below presents the findings about the views of students.

## **LEARNER CENTERED METHOD IN TEACHING AND LEARNING**

**Table 1: Students' Views on Status of Use of Learner Centered Method in Teaching and Learning Biology in Upper Level of Rusizi District Secondary School**

Statements	Never		Rarely		Sometimes		Often		Always		Mean	Std
	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%		
Our biology teacher spend most of the class time giving lectures or presentation	10	16.1	7	11.3	27	43.5	5	8.1	13	21.0	3.06	1.3
We work in group's on assignment	2	3.2	2	3.2	28	45.2	8	12.9	22	35.5	3.7	1.08
We are involved in deciding what and how we want to learn	2	3.2	17	27.4	15	24.2	6	9.7	22	35.5	3.4	1.3
We are given opportunity to explain results of our group discussion	0	0	7	11.3	13	21.0	6	9.7	36	58.1	4.1	1.1
We are given enough time to show what we have learnt	4	5.4	5	8.1	23	37.1	12	19.4	18	29.0	4.0	3.9
We interact with instructor, and with one another	3	4.8	12	19.4	31	50.0	3	4.8	13	21.0	3.1	1.1
We are given opportunity to evaluate ourselves	3	4.8	6	9.7	22	35.5	9	14.5	21	33.9	4.4	6.6
During biology teaching and learning, the classroom is noisy and busy	12	19.4	8	12.9	22	35.5	8	12.9	12	19.4	3.0	1.3

Source: Research findings, 2023

Based on this table, the findings above implies that learner-centered method is not used effectively in teaching and learning biology in advanced levels of secondary schools of Rusizi district in Rwanda.

## **LEARNER CENTERED METHOD IN TEACHING AND LEARNING**

**Table 2: Teachers' Views on Status of Use of Learner Centered Method in Teaching and Learning Biology in upper level of Rusizi District Secondary Schools**

Statements	Never		Rarely		Sometimes		Often		Always		Mean	Std
	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%		
I spend most of the time class giving lectures or presentation	0	0.0	1	25	2	50	1	25	0	0.0	3.06	1.3
I allow students to work in group's on assignment	1	25	3	75	0	0.0	0	0.0	0	0.0	1.7	0.5
I involve in deciding what to be learnt and how to learn it	0	0.0	2	50	2	50	0	0.0	0	0.0	2.5	0.5
I give students opportunity to explain results of their group discussion	0	0.0	1	25	3	75	0	0.0	0	0.0	2.7	0.5
I give enough time to students to show what they have learnt	0	0.0	1	25	1	25	2	50	0	0.0	1.7	0.5
I favor students' interaction with me and with one another	0	0.0	0	0.0	4	100	0	0.0	0	0.0	2.0	0.0
I give students opportunity to evaluate themselves	2	50	1	25	0	0.0	1	25	0	0.0	2.0	1.4
During biology teaching and learning, the classroom is noisy and busy	3	75	1	25	0	0.0	0	0.0	0	0.0	1.2	0.5

Source: Research findings, 2023

In addition, during the preparation of the current paper, the researcher sought to get the views of the key informers about the status of use of learner centered method in teaching and learning biology in advanced level in secondary schools of Rusizi district. The key informer who participated in this research were 4 DOSs and 4 Head Teachers from the 4 selected secondary schools in Rusizi district.

In all the interaction with the above mentioned key informers, the key question was the following: *What is the status of learner-centered method in teaching and learning biology in your school.* All four Head teachers participated in this research responded that in their schools, the learner-centered method in teaching and learning biology is effectively applied. One of them added that learner-centered method is obliged to biology teachers and to all teachers of the other subjects because the competency based

## ***LEARNER CENTERED METHOD IN TEACHING AND LEARNING***

curriculum that is being implemented in Rwandan education forces teachers to use learner-centered method in all teaching and learning activities.

After collecting data from Head Teachers, the researcher collected data from DOSs not only to ensure that all necessary information was collected but also to compare responses from different sides. The following are answers provided by DOSs.

In this school, learner-centered method is used by biology teachers. The teachers of biology while teaching biology, they try to put students in groups and allow them to learn through discussion. This is why I say that the status of learner-centered method in teaching and learning biology is not effective in our school. Source: Research Findings (2023).

According to this respondent, in their school, learner-centered method in teaching and learning biology is effective because the teachers allow students to work collaboratively in groups. The second respondent provided the following answer:

In our school, learner-centered method in teaching and learning biology is not bad because the teacher of biology involves students in teaching and learning activities. Students participate in teaching and learning activities by doing experiments, by asking questions and by interacting with one another. Source: Research Findings (2023)

The responses provided by the above respondent indicate that in their schools, learner-centered method in teaching and learning biology is effective because students work in groups, conduct biology experiments and interact between them.

The third respondent said the following:

In biology teaching and learning biology learner-centered method is not used as it is required. This is because learner centered method requires much time that teachers do not have. The teachers have a lot to cover in order to facilitate students to be ready for the national examinations. Thus, the teacher of biology fail to implement the learner centered methodology as it is with the purpose of saving a time. Source: Research Findings (2023)

This extract indicates that, learner-centered method is not fostered in teaching and learning biology under reason to save time and finalize the syllabus.

In addition, another respondent said, Learner-centered method in teaching and learning biology is used even if I can't say that it is used at the required extent. Our teachers of biology try to implement it despite various challenges. Because of the numbers of students that we have in one classroom, it is not easy for our biology teacher to implement learner-centered method easily. Source: Research Findings (2023)

The response of this respondent shows that learner-centered method is used in teaching and learning biology even if it is not used successfully due to crowded classroom and the associated challenges. From the responses provided by key informers, even if learner-centered method is

## ***LEARNER CENTERED METHOD IN TEACHING AND LEARNING***

implemented in teaching and learning biology, it is not implemented successfully due to various challenges big class size, limited time and teachers responsibilities.

Furthermore, the findings from observation indicate that learner-centered method is not used effectively in teaching and learning biology in advanced level of secondary school of Rusizi District in Rwanda.

The findings of the current study did not go far from the findings of the study conducted by Schweisfurth (2011) who conducted a study on effective use of learner-centered method and find the following.

One thing that is certain is that teachers are unaccustomed to effective use of learner-centered practice in their own educational experiences or in the systems in which they work. Teachers are very unlikely to use it effectively learner-centered approach in their teaching activities. This can make things worse as well by undermining educational productivity (Schweisfurth, 2011: 3).

The above extract evidenced that some of the teachers do not use learner-centered method accordingly based on their low level of competency in education sector. Therefore, teachers who teaches biology in advanced level in secondary schools of Rusizi district in Rwanda do not use effectively learner-centered method in biology teaching and learning process. Moreover, the findings of this study do not go far from the findings of Tadesse (2020) who conducted a research effectiveness of student-centered approach and find that that, learner student-centered approach is still a dilemma since teachers especially those who are familiar with teacher-centered approach do not prefer using learner-centered approach because they consider it as an effort and time consuming approach. This implies that some of the teachers do not like using learner-centered method. Therefore, the findings of the current study evidences that implies that learner-centered method is not used effectively in teaching and learning biology in advanced levels of secondary schools of Rusizi district in Rwanda.

**Factors Hindering Effective Use of Learner-Centered Method in Teaching and Learning Biology in Upper Level of Rusizi District Secondary Schools:** The second objective of this research was to investigate factors that may be hindering effective use of learner-centered method in teaching and learning biology within upper level of Rusizi District secondary schools. In order to get information about such factors, firstly, the research requested teachers to fill questionnaires. Secondary, the researcher conducted interviews with key informers (DOSs and Head teachers) from the selected schools. Lastly, the researcher used observation method. The following are the finding that have been found.

**LEARNER CENTERED METHOD IN TEACHING AND LEARNING**

**Table 3. Factors Hindering Effective Use of Learner-Centered Method in Teaching and Learning Biology in Upper Level of Rusizi District Secondary Schools**

Statements	SA		A		N		D		SD		Mean	Std
	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%		
Big class size is hindering effective use of learner-centered method in biology education in our school	1	25	2	50	1	25	0	0.0	0	0.0	2.0	0.8
Limited time is hindering effective use of learner-centered method in biology education in our school	1	25	3	75	0	0.0	0	0.0	0	0.0	1.7	0.5
Scarcity of teaching and learning resources is hindering effective use of learner-centered method in biology education in our school	1	25	3	75	0	0.0	0	0.0	0	0.0	1.7	0.5
Teachers' workload is hindering effective use of learner-centered method in biology education in our school	3	75	1	25	0	0.0	0	0.0	0	0.0	2.2	0.5

Source: Research Findings (2023)

The findings gotten from teachers indicate that the factors hindering effective use of learner-centered method in biology education in upper secondary school of Rusizi district are: limited time, scarcity of teaching and learning resources and teachers' heavy workload.

During data collection about factors hindering effective use of learner-centered method in biology education in secondary schools of Rusizi district in Rwanda, the researcher conducted interviews with DOSs and Head teachers.

In order to get required information, all the interaction was around the key question. *“What are the factors hindering effective use of learner-centered method in biology in teaching and learning in advanced level in your school?”* The following are answers provided by the respondents.

One of the challenge that affect effective use of learner-centered method in biology teaching and learning is limited teachers' knowledge about the implementation of learner-centered method. Teachers have not been trained enough to implement learner-centered method while teaching and learning. This is affecting negatively our teacher of biology to implement learner-centered method effectively in biology teaching and learning.

Source: Research Findings (2023)



## ***LEARNER CENTERED METHOD IN TEACHING AND LEARNING***

According to this respondent, the challenge that is hindering effective use of learner-centered method in biology teaching and learning in advanced level in their school, is teachers' low ability to implement learner-centered method in biology teaching and learning.

Another teacher said,

The factor that is hindering effective use of learner-centered method in biology teaching and learning in advanced level in this school is that some of our teachers are not used to learner-centered method implementation. Some of them have studied via teacher-centered approach and they prefer using it because they consider it is a very easier method to use. Even if the new curriculum requires teachers to use learner-centered methods, while teaching and learning find themselves using teacher-centered method because they are not familiar with learner centered-d method implementation. Source: Research Findings (2023).

The answer of the above respondent highlights that that some teachers prefer using teacher-centered method because they are not familiar with learner-centered method and this hinders effective use of learner-centered method precisely in biology teaching and learning in advanced level in the school of the current respondent.

The third respondent who participated in this study said,

The factor that is hindering effective use of learner-centered method in biology teaching and learning in advanced level in this school is the factors of limited funds. The implementation of learner-centered methods requires enough teaching and learning materials that we don't have in this school. In biology teaching and learning, for the teacher to implement learner-centered methods, enough books, charts chemicals, microscopies are needed. Some of these materials are expensive to the extent that our school can't afford them. Source: Research Findings (2023)

The above extract shows that the factor that is hindering effective use of learner-centered method in biology teaching and learning in advanced level in this school is the factor of limited funds to afford biology teaching and learning required in effective implementation of biology teaching and learning.

The fourth respondent provided the following answer: The factor that is hindering effective use of learner-centered method in biology teaching and learning in advanced level in this school is associated with the objectives of biology teaching and learning. During biology teaching and learning, the teacher may focus on helping students to pass national exams and forget all other things. Because the use learner-centered method requires teachers enough preparation, in order to attain teaching and learning objectives, teachers prefer using teacher-centered method to make their work easier and this affect the effective use of learner-centered method in biology teaching and learning in this school of ours. Source: Research Findings (2023)

## ***LEARNER CENTERED METHOD IN TEACHING AND LEARNING***

The above extract shows that the teacher of biology do not use learner-centered method with the purpose of achieving educational objectives of enabling students to score higher marks in biology national exams.

Therefore, based on answer provided by DOSs and Head Teachers during interviews, the findings of the current study reveal that the factors that are hindering effective use of learner-centered method in biology teaching and learning in advanced level in secondary schools of Rusizi District are: insufficient teacher' training about implement of learner-centered method, resistance to change, limited funds to afford biology teaching and learning and biology teaching and learning objectives.

In fact, the findings of the current study are related with the findings of the study conducted by An & Reigeluth (2011:61). The following are the findings of the research conducted by these researchers. There are several barriers to implementing learner-centered instruction. These include: lack of time, lack of knowledge about learner-centered instruction, subject culture, teachers' attitude toward learner-centered instruction, lack of funding, limited resources, students' behavior and class size.

Strategies to Alleviate Challenges Associated to Effective Use of Learner-Centered Method: The third and the last objectives of the current study was to explore strategies that can be used to alleviate the challenges associated to the effective use of learner-centered method in teaching and learning biology within upper level of Rusizi district secondary schools. In order to achieve this objective, at the first hand the researcher collected information from four biology teachers by filling the questionnaires. On the other hand, the researcher conducted interviews with DOSs and Head Teachers from the selected schools of Rusizi district in Rwanda. The answers provided by teachers, DOSs and Head Teachers fall into four strategies. The following are answer provided.

The strategy that can be used alleviate the challenges associated to the effective use of learner-centered method in teaching and learning biology within advanced level of secondary schools of Rusizi district is preparation of trainings and workshops for biology teachers. If the Ministry of Education through its bodies organize trainings and workshops for biology teachers about using learner-centered method, such teachers can use learner-centered method effectively in biology teaching and learning. Source: Research Findings (2023)

According to the above respondent, trainings and workshops about learner-centered method implementation can be used as a strategy to overcome challenges affecting effective use of learner-centered method in biology teaching and learning in secondary schools of Rusizi district in Rwanda.

In addition, some of the key informers of the current study witnessed this. The strategy that can be used alleviate the challenges associated to the effective use of learner-centered method in teaching and learning biology

## ***LEARNER CENTERED METHOD IN TEACHING AND LEARNING***

within advanced level in our school is availing enough biology teaching and learning aids such as textbooks and learning materials: Providing up-to-date biology textbooks and learning materials is essential for learners to engage with the subject matter effectively. Textbooks should align with the curriculum and incorporate learner-centered approaches, such as inquiry-based activities, case studies and real-world examples. Additional supplementary materials, such as visual aids, simulations, and online resources, can enhance students' understanding and promote active learning. Source: Research Findings (2023)

According to this respondent, in order to overcome challenges affecting effective use of learner-centered method in biology teaching and learning in advanced levels, the strategy that can be used is the provision of biology books and other materials needed in effective implementation of learner-centered method in biology teaching and learning.

The strategies of alleviating the challenges associated to the effective use of learner-centered method in teaching and learning biology within advanced level in secondary schools is reducing biology teachers' workload. Implementing learner-centered methods often requires teachers to design and plan engaging and interactive lessons. When teachers have adequate time allocated for lesson planning, they can carefully consider the learning objectives, select appropriate resources, and design activities that promote student engagement and active learning. Source: Research Findings (2023)

According to the above respondent, because implementation of learner-centered method requires enough time, biology teachers' workload should be aligned in order to overcome the challenge of biology teachers' heavy workload that is hindering effective use of learner-centered method in biology within advanced level in secondary schools of Rusizi district in Rwanda.

In addition, some of the responses provided in interviews indicated that technology can be useful in overcoming factors affecting effective use of learner-centered method in advanced levels of secondary schools located in Rusizi district in Rwanda.

Technology can be used to overcome challenges associated with effective use of learner-centered method in biology teaching and learning in our school. Technology can provide students with access to a wide range of online resources, digital textbooks, interactive simulations and multimedia materials. Students can explore biology concepts at their own pace, engage with interactive content and access up-to-date information from credible sources. This promotes independent learning which the back is born of learner-centered method.

Source: Research Findings (2023)

The above extract shows that technology is useful in effective use of learner centered method as it allow students and teachers to access

## ***LEARNER CENTERED METHOD IN TEACHING AND LEARNING***

different resources indispensable in the implementation of learner centered method implementation. Finally, Head Teacher 3 also said that the strategy that can be used to alleviate challenges associated with effective use of learner-centered method in biology teaching and learning in their school is ICT integration in biology teaching and learning.

Those strategies are the following: increasing teacher training and professional development about using learner centered method, availing enough resources for biology teaching and learning, teachers' workload alignment, integrating technology in biology teaching and learning.

Therefore, the strategies that can be used to alleviate the challenges associated to the effective use of learner-centered method in teaching and learning biology within advanced level of secondary schools of Rusizi district have been identified.

The strategies identified include: increasing teacher training and professional development about using learner centered method, availing enough resources for biology teaching and learning, teachers' workload alignment, integrating technology in biology teaching and learning. According Stavreva & Kirova (2016:296), technology is useful in biology teaching and learning. The use of technological tools encourages students to think independently and it increase their activation in solving problems. However, Hurney (2012: 137) says that addressing teachers' workload is crucial to ensure the successful implementation of learner-centered methods in biology teaching and learning. It requires providing teachers with reasonable work expectations, adequate planning time, opportunities for collaboration, and ongoing professional development support. Therefore, in order to alleviating the challenges associated to the effective use of learner-centered method in teaching and learning biology within advanced level in secondary schools of Rusizi district in Rwanda, biology teachers' workload should be aligned.

### **Conclusion**

In conclusion, the outcomes of this paper underscore two key points. Firstly, the utilization of the learner-centered method in the teaching and learning of biology at the advanced level within Rusizi district's secondary schools is not being effectively employed. Secondly, the research findings reveal a range of obstacles impeding the successful implementation of the learner-centered approach, including constraints such as time limitations, inadequate availability of teaching and learning materials, heavy teacher workloads, insufficient familiarity with learner-centered instructional techniques, prevailing biology subject norms, instructors' attitudes towards the learner-centered approach, and financial constraints that hinder the provision of adequate resources for biology education in the advanced levels of secondary schools within Rusizi District, Rwanda. Lastly, findings of the current study suggested some of the strategies that can be used to alleviate the challenges associated to the effective use of learner-

## ***LEARNER CENTERED METHOD IN TEACHING AND LEARNING***

centered method in teaching and learning biology within advanced level of secondary schools of Rusizi district. These include, among others, increasing teacher training and professional development about using learner centered method, availing enough resources for biology teaching and learning, reducing teachers' workload, and integrating technology in biology teaching and learning.

### **Reference**

- Aaronsohn, E. (1996). *Going against the Grain: Supporting the Student-centered Teacher*. Thousand Oaks, CA: Corwin Press.
- Abenga, E. S. (2005). *The Adoption and Use of New Educational Technologies in the Training of Teachers of English in Primary Teachers Colleges in Kenya*. (Doctoral Dissertation, Moi University, Kenya).
- Abrahams, I. Z. (2005). *Between Rhetoric and Reality: The Use and Effectiveness of Practical Work in Secondary Schools Science*. (Doctoral Dissertation, University of New York, UK).
- Ackers, J., & Hardman, F. (2001). Classroom Interaction in Kenyan Primary schools. *Compare*, 31(2), 245-261.
- Aggarwal, J. C. (2003). *Essentials of Educational Technology Teaching Learning Innovations in Education*. Delhi: Vikas Publishing House pvt Ltd.
- Aggarwal, J.C. (2008). *Principles, Methods & Techniques of Teaching*. Delhi: Vikas Publishing House pvt Ltd.
- Alexander, P., & Murphy, P. (2000). *The research Base for APA's Learner-Centred Psychological Principles*. Washington: American Psychological Associations.
- American Association of School Librarians. & Association for Educational Communications and Technology. (1998). *Information power: Building partnerships for learning*. Chicago: ALA.
- Amunga, J. K., Musera, G., & Amadalo, M.M. (2011). Disparities in physics academic achievement and enrollment in secondary schools in Western province: Implications for strategy renewal. *Problems of Education in the 21st Century*, 31, 18-32. Retrieved from [http://www.scientiasocialis.lt/pec/files/pdf/vol31/18-32.Amunga\\_Vol.31.pdf](http://www.scientiasocialis.lt/pec/files/pdf/vol31/18-32.Amunga_Vol.31.pdf).
- An, Y. J., & Reigeluth, C. (2011). Creating Technology-Enhanced, Learner-Centered Classrooms: K-12 Teachers' Beliefs, Barriers, and Support Needs. *Journal of Digital Learning in Technology Education*, 28(2), 54-62. <http://dx.doi.org/10.1080/21532974.2011.10784681>.
- Anyanwu, S. (2008). Challenges of Promoting Active-Learning: Student-centered pedagogies. Retrieved from <http://www.equip123.net/docs/EIIPChallengesPromotingActiveLearning.pdf>
- Arons, A. (1993). Guiding Insight and Inquiry in the Introductory Physics Laboratory. *The Physics Teacher* 31, 278-282.
- Association of American College and Universities. (2002). *Greater Expectations: A new Vision for Learning as a Nation Goes to College*.

## **LEARNER CENTERED METHOD IN TEACHING AND LEARNING**

- Washington DC: Association of American College and Universities.
- Association of College and Research Libraries & American Library Association. (1989). *Presidential Committee on Information Literacy*. Washington: ALA.
- Ayemi, T. O. (2010). Teaching Experience and Learners Learning Outcomes in Secondary Schools in Ondo State, Nigeria. *Educational Research & Review*, 3(6), 204-212.
- Baird, J. R, Mitchell, I. J. (1986). *Improving the Quality of Teaching and Learning: An Australian Case Study*. Melbourne Victoria: Monash University.
- Bamberger, Y., & Tal, T. (2008). An Experience for the Lifelong Journey: The Long-Term Effect of a Class Visit to a Science Center. *Visitor Studies*, 11(2), 198–212.
- Barak, M., Doppelt, Y. (2000). Using Portfolios to Enhance Creative Thinking. *Journal of Technology Studies*, 26, 16–24.
- Baran, R. A., & Byrne, D. (1987). *Social psychology: Understanding human Interaction* (5th ed.). Boston, MA: Allyn and Bacon.
- Bowers, J.W. (1986). Classroom Communication Apprehension: A survey. *Communication Education* 35,372-378.
- Daworiye, P. S., Alagoa, J., & Enaregha, E. (2015). *Factors Affecting the Teaching and Learning of Biology in Kolokuma/Opokuma Local Government Area, Bayelsa State, Nigeria Environmental Consecration View project HEAVY METAL CONTAMINATION IN YENAGOA View project*. www.ijcrbp.com
- Elkhidir, N. (2020). Effective Teaching Strategies in Biological Education: Present and Future Prospects. In *Open Science Journal*, 4(2), 1-8
- Ferguson, N.B.L. (1986). Encouraging responsibility, Active Participation and Critical Thinking in General Psychology Students. *Teaching of psychology*, 13,217-218(II).
- Fritschner, L. M. (2000). Inside the undergraduate college: Faculty and students differ on the meaning of participation. *The Journal of Higher Education*, 71,342-362).
- Hager, W.R. (1974). An Investigation of Verbal Behavior and Learning Climate in Undergraduate Engineering Classroom. *Journal of research in science Teaching* 11(2), 121-131.
- Hornby, A S(1999). *Oxford Advanced Learners Dictionary*, Oxford university press, 8th Edition.
- Hurney, C. A. (2012). Learner-Centered Teaching in Nonmajors Introductory Biology: The Impact of Giving Students Choices. *Journal of Microbiology & Biology Education*, 13(2), 133–141. <https://doi.org/10.1128/jmbe.v13i2.458>

## ***LEARNER CENTERED METHOD IN TEACHING AND LEARNING***

- Hyde, C.A:&Ruth, B.J. (2002). Multicultural Content and Participation: Do Student Self –Disclose *Journal of Social Work Education* 3(2), 167-184.
- Lagoke, B.A. (1997). Toward an Elimination of Gender Gulf in Science Concept Attainment through the Use of Environment Analogs. *International Journal of Science Education*, 9(4), 365-367.
- McCombs, B.L (2004). *What Do We Know about Learners and Learning?* The Learner –Centered Framework: Bringing the System into Balance.
- Miller, J. & Metz, M. (2014). Learner centered education in developing country context: From Solution to Problem? *International Journal of Education Development*, 31 (2) 423-435.
- Nunn, C.E. (1996). Discussion in the College Classroom: Triangulating Observational and Survey Results. *The journal of Higher Education*, 67,243-266.
- Stavreva, V., S., & Kirova, S. (2016). *Application of ICT in teaching biology (Example of a lesson) Supplemental Instruction as a Tool for Improving Students' Language Competence at the Faculty Of Philology View Project Heavy Metal Concentrations in Vegetables With Growth Stage and Plant Species Variations View project*. <https://www.researchgate.net/publication/303737905>
- Tadesse, L. (2020). Problems Affecting the Practice of Student-Centered Approach in Teachings Social Studies. *Journal of Pedagogical Sociology and Psychology*, 2(2), 69–79. <https://doi.org/10.33902/JPSP.2020262940>.
- Usman, (2006), *Strategies for Conducting Practical in Science, Technology and Mathematics*. A Lead Paper, Presented at STAN Workshop, at Federal Government Girls' College Malali, Kaduna.