

Journal of Educational Research & Social Sciences Review (JERSSR)

Teacher Educators' Pedagogical Preferences: Evidence from Public Universities of

Central Punjab, Pakistan

1. **Sadia Afzal**

Ph.D. Scholar, Department of STEM Education, Division of Education, University of Education, Lahore

Email: sadiaafzal@ue.edu.pk

2. **Muhammad Amin**

(Corresponding Author)

Associate Professor of Education (Department of Educational Leadership and Policy Studies), Division of Education, University of Education, Lahore Email: amin@ue.edu.pk

Abstract



The purpose of this qualitative study was to explore the preferences of teacher educators' towards their pedagogical practices, the rationale of such practices and how actually they use them in their classes. A semi-structured interview was conducted with 21 teacher educators' of 6 different public sector universities of Central Punjab, Pakistan. Results showed that the majority of the teacher educators' prefer to educate students via lecture, discussion, and question-and-answer. They reasoned for their choices, including: effective to provide theoretical information to students; to cover course contents well in time; useful in absence of resources; topic requirement; lack of student knowledge; teacher expertise; increase student participation in class; ease in assessing student comprehension; and keeping in views facts on the ground. Very few female teacher educators' utilize learner-centered pedagogies because it produces skilled-oriented and self-directed learners, increase student engagement and confidence, and boost teacher motivation and self-satisfaction. Induction training, ongoing professional development, incentives and a robust system of checks and balances are required to ensure that constructivist pedagogies are being put into practice.

Keywords: Preferences, Pedagogical Practices, Traditional Methods, Constructivist Methods

Introduction

Higher education system is continuously facing challenges due to prompt changes in the contemporary world (The Fourth Industrial Revolution, IR 4.0). The Fourth Industrial Revolution requiring innovative ways of considering and using human efforts and skills (Teo, Unwin, Scherer and Gardiner, 2021). The Fourth Industrial Revolution not only influence the economy sector but also the education sector. Teacher education institutions being influencers are responsible for to equip young people with twenty-first century skills. The twenty-first century skills are becoming crucial both for educators as well learners to compete in this Fourth Industrial Revolution (Laar, Deursen, Dijk, & Haan, 2017 and Kim, Raza & Seidman, 2019). Prospective teachers require preparations of these twenty first skills i.e. (creativity, critical thinking, problem solving, learning to learn, lifelong learning, collaboration communication, ICT literacy, flexibility and self-direction) to work in future market. Moreover, teacher educators' in teacher training institutions must educate learners with the desired competencies that are prerequisite of twenty- first century. However, these twenty-first century skills have also created the need to reassess the teacher role and their teaching methods all over the globe (Senturk, 2020).

Literature revealed that teacher has central role in the advancement and opulence of any nation (Patel & Thakkar, 2017). Nobody disavow the part of committed, operative and proficient teacher in the entire education system because teachers are the leading collaborator of teaching learning process (Lowe and Prout, 2019). Research study focused that teacher proficiency must be enhanced in the area of knowledge, understanding and practices (Bunyi, Wangia & Limboro, 2013). An effective teacher is one who continually recommences being a professional and with the expedition to give utmost excellence of education. Such teacher accept challenging situations and

incorporate new teaching strategies while teaching as well how to engage their students with technology all over the world (Kelentric, Helland and Arstrop, 2017).

Teacher teaching style has direct link with their educational value system and stem from their educational philosophy. Being aware of their teaching style can help the teacher in improving their teaching methods, how to effectively engage students in learning process and consequently enriched students learning and outcomes (Persaud, 2022).

The literature clearly indicated that creativity, innovation, critical thinking, collaboration, communication, problem solving and adaptability are the basic skills that are necessary to learn in 21st century global economy (Kim, Raza & Seidman, 2019). These skills cannot be learned in traditional education system that is prevailing since the early 1900s (Darling-Hammond, 2010). Further, knowledge economy required fundamental shifts in our teaching and learning process where students need are addressed and prepare them to learn and work in postmodern society (Fullan & Langworthy, 2014). Comfort and Timms (2018) explained their concerns about learning in the twenty-first century by referencing the transmission model. In this model, teachers teach students factual information, but this doesn't always help students understand and use what they've learned. They think that you can't learn 21st century skills unless you are taught them. Research clearly demonstrates that constructivist approach is the only way to equip young individuals with these twenty first century skills (Neutzling, Pratt & Parker, 2019).

Constructivist theories consider the learner to the center of all sorts of educational activities and give importance to learner needs, interests, attitudes and beliefs because the success of teaching learning process directly linked with learner (Egmir and Çelik, 2019). Similarly, Neutzling, Pratt & Parker (2019) and Holmes (2019) explained that constructivist approach to learning has been much accepted to higher education as these promise to develop confidence, creativity, and critical thinking skills among learner. In order to promote critical thinking and problem solving skills among learner teacher must know about variety of teaching strategies and techniques. Teacher should focused on pedagogy of care, cooperation and collaboration. Teachers effectively used constructivist theory to engage learner in multiple learner-centered approaches (Kelier, 2018). For example, inquiry-based instruction, Problem-based learning (PBL) and Project-based learning (PjBL) , all these approaches utilized constructivist theory and increase students level of engagement, critical thinking, positive attitude, motivation and academic skills (Burris and Garton 2007; Tamim and Grant, 2013 and Moustafa, Assaraf & Eshach, 2013). Teacher centered approach emphasized on imparting subject matter knowledge and put correct information to the students. Teacher with this belief orientation has more traditional attitudes towards his / her teaching profession. Whereas, student centered approach emphasized to facilitate student learning by themselves and through mutual construction of knowledge. Teacher in student centered classroom consider student as active member and put more responsibility of learning on students. (Markic and Eilks, 2008; Al-Amoush, Markic, Usak, Erdogan & Eilks, 2013 and Wang, 2011).

Keeping in view the importance of the twenty first century skills in in the fourth industrial revolution and how these skills created the need to reassess the teacher role and their teaching methods all over globe, the present study designed to explore the preferences of teacher educators' towards their pedagogical practices, the rationale of using those practices and how actually they use in their classes.

The following research objectives are formulated in light of the study's purposes;

1. What are the prefer pedagogical practices of teacher educators' at university level in Central Punjab?
2. Why teacher educators' use those pedagogical practices while teaching prospective teachers during class?
3. How teacher educators' are applying those pedagogical practices while teaching?

Methodology

Research Design

This study used the qualitative approach because this approach allow the researcher to understand and discover the meaning from participants' view regarding research problem. In addition, this approach accentuated on value-laden nature of the research process and its outcomes. This approach allows the participants to describe in details their preference of teaching methods during class, particularly, why and how they use those methods in their own words.

Participants

Researcher purposefully selected 21 teacher educators' of education department from 6 different public sectors universities of Central Punjab, Pakistan. The researcher selected teacher educators' based on gender, age, qualification, designation and work experience.

The participants' demographic data is presented in table I below.

Table 1: Profile of Teacher Educators'

Interviewee	University	Gender	Age	Qualification	Designation	Work Experience
1	A	F	39	PhD	Assistant Professor	16
2	A	M	35	PhD	Assistant Professor	10
3	A	F	53	PhD	Assistant Professor	20
4	A	M	42	PhD	Assistant Professor	14
5	A	F	47	PhD	Assistant Professor	19
6	A	M	55	PhD	Associate Professor	25
7	B	F	33	MPhil	Lecturer	7
8	B	F	52	PhD	Associate Professor	18
9	B	F	58	PhD	Assistant Professor	28
10	B	F	37	MPhil	Lecturer	9
11	A	F	38	PhD	Lecturer	13
12	C	F	48	PhD	Assistant Professor	17
13	C	F	35	PhD	Lecturer	7
14	D	F	34	MPhil	Lecturer	6
15	D	M	49	PhD	Assistant Professor	18
16	E	M	54	PhD	Associate Professor	27
17	E	M	51	PhD	Associate Professor	24
18	E	M	38	PhD	Assistant Professor	12
19	E	M	41	PhD	Assistant Professor	14
20	F	M	47	PhD	Assistant Professor	19
21	F	F	37	PhD	Assistant Professor	12

The data shown in this table revealed that this study was conducted 12 female and 9 male teacher educators' representing six different public sector universities of Central Punjab. The ages of the participants' varies 33 to 58. Majority of the participants' were PhD qualified and serve as assistant professor while few were MPhil and worked as lecture. Only four participants' were associate professor and have huge experience ranged from 18-27. While the remaining participants' work experience ranged from 6 to 20. All the respondents' were teaching B.Ed (Hons), BS Education, MPhil/MS and PhD students in Education department of different public sectors universities of Central Punjab.

Data Collection Procedure/Instrument/Data Analysis

Primarily, the researcher visited the relevant department in different universities, give brief introduction about the scope of the study and obtained their consent to participate in the study. The researcher ensured the confidentiality and anonymity to the participants. After that, researcher invited the participants for interviews and conducted recorded interviews. The researcher collected data through semi-structured interviews from the participants. Semi-structured interviews provide rich account of participants' responses and context (Cohen, Manion and Morrison, 2018). Bryman & Bell (2019) elucidated that semi-structured interview provide reliable data. Moreover, in this technique, researcher has the list of questions and opportunity to ask further questions to gain in depth understanding. These interviews were conducting in the offices of relevant faculty member at convenient time. Each interview was conducted in one setting and the time duration for each interview was approximately 20 to 25 minutes. After recording, these semi-structured interviews were transcribed immediately. Content analysis was used to analyze the data and researcher formulated code, category, sub- themes and themes through inductive process. This approach allow the researcher to move form more from specific to general.

Findings and Discussion

The data revealed three major themes first pedagogical practices preferences, second reasons for these practices preferences and lastly the way they use these methods while teaching.

Pedagogical Practices Preferences

The data evinced that both male and female respondents considered the significance of both teacher centered and learner centered methodologies. But majority of the respondents' (70%) including male (45%) and female (25%) prefer to use traditional approach to teach students.

Below mentioned four categories were emerged:

- a) Content Nature and Learner Cognitive abilities
- b) Teacher Centered Methodologies
- c) Student Centered Methodologies
- d) Mixed/Blended Methodologies

Content Nature and Learner Cognitive abilities

Only 10% female teacher educators' said that the approach they endorse to teach varies depending on the nature of the content and the students' cognitive abilities.

A female teacher educator from the University B stated that

Methodology is the tool box for the educators. You choose tool from it according to situation and according to the need as per requirement of the subject or as per requirement of your students' level (Respondent (R) 7).

In the same way another female teacher educator from the University B reported that

It depends on the topic that you teach and the level of the students or the subject you teach. So it depends on you, if you are a competent teacher you have to adjust yourself accordingly to the situation. So I usually teach as per the requirement and the mental capacities of my students, to be the requirement of the content or you can say the need of the subject matter (Respondent (R) 8).

Traditional Approach: Teacher Centered Methodologies

Majority of the respondents' (70%) including male (45%) and female (25%) prefer to use traditional approach to teach students. They further explained that they teach students through lecture method, discussion method and questions answer methods as well demonstration methods.

Lecture Method

A male teacher educator from the A University stated:

[I] mostly rely on the lecture method to give conceptual information and to cover course contents. I deliver lecture until students grasped the concepts and ask questions from them to make learning meaningful and interesting (Respondent (R) 1).

A Female teacher educator from the B University replied as follow "On University level preferable method is lecture method according to time constraints & their syllabus (R 7)."

Another male teacher educator from the E University reported:

As you know our education system is semester system and we have to cover maximum content in our semester, so, mostly lecture method is used. It's also depends on the content that which method is suitable (R18).

One more male teacher educator from the D University indicated:

I mostly use lecture method. Firstly I teach the students then asked them to explain. I deliver lecture to explain contents and provide materials to students (R15).

Discussion Method

A Female teacher educator from the B University stated:

I prefer discussion method mostly. Because I teach MS classes I can't teach them by lecture method. I asked students read out the lesson at home after it we will discuss in the class. In start, I give them an overview after that we start discussions on the topics (R 8).

Similarly, another female teacher educator from the C University replied as follow "We also use discussion method. We assign them a topic on which they discuss and interact with me and other fellows (R13)."

Correspondingly, a male teacher educator from the E University reported:

Mostly, I use discussion method. Basically we give them review first. We focus on the involvement of students at high level. We encourage our students to participate in classroom discussion (R17).

A Female teacher educator from the F University explained:

[I] encourage students to discuss the topic. For example write the topic/social issues on the board and ask students to discuss and share your opinion in class regarding this (R21).

Question Answer Method

A male teacher educator from the A University stated that “During class, we try to make students active by question answer method. We try to do activity in class to make students more active (R3).”

A female teacher educator from the B University stated:

Mostly I asked them to arise question. If the students do not ask question I ask them questions. It's my routine if I teach them a paragraph, I ask questions to make learning effective (R10).

Demonstration Method

Only one female teacher educator from the B University stated regarding use of demonstration method as;

Basically, I teach mathematics and statistics so I use demonstration method. Explaining them theories, teach them numerical, firstly I demonstrate to my students then we solved exercises (R 9).

Student Centered Methodologies

Only

15% of female respondents said that they use learner centered methodologies such as collaborative learning and cooperative learning, group work, problem solving methods, inductive methods, project work and hands on activities to teach students.

Collaborative & Cooperative learning

A female teacher educator from the A University stated about collaborative learning and cooperative learning

Now a days I am teaching through collaborative learning and also I use cooperative learning in the form of group work. I focus on students learning more. I focus that students have to participate actively and their cooperation is important. We use all those strategies which are feasible to students. We use all those which are in the access of students. Therefore, I like students centered method (R3).

Project Method

A female teacher educator from the D University reported about project method

Allocate project work ...for example this week assign video editing projects , they all are working on it and I assist where they face difficulty.....through videos they take interest and ask about different things and understand lesson (R14).

Project method and flipped class room concept

A female teacher educator from the University C talked about project method and flipped class room concept in this way as

From previous two to three years I am using project method and flipped class room concept. In one semester I use flipped classroom learning while in other semester I use project base learning, actually nature of the course matter. Both these method switch to each other at time. If these methods are not used. I try to use inductive methods of teaching. Sometimes I use just in time teaching. It's dependent upon the nature of questions asked by students. It also depends upon the nature of the content (R12).

Problem solving method

A female teacher educator from the B University stated regarding problem solving method

I also use activity based method and problem solving method .I give them material and divide them into groups. I give them a situation. I asked them to find the problem and its solution. I say them research and give me logics about the different problems in situation (R12).

Mixed/Blended Methodologies

Only 15% of female respondents and 5% male teacher educators' reported that they teach students through mixed methods/blended.

A female teacher educator from the A University stated

I mix two or three methods at the same time like Project method & inquiry method and similarly, lecture as well as demonstration method. If it is sort of environmental education then its requirements are different. We also do field trips related to subjects. If possible we also do exhibition. But presentations are must (R 11).

Another female teacher educator from the A University reported that “First, I use lecture method then as we are studying about business so I use case studies and discussion method (Respondent (R) 5).”

A female teacher educator from the B University expressed her view as;

If you talk about specific methodologies that you are saying, I should think about, it's a blended. As a teacher you should be preplanned obviously but I do not need to be preplanned because I am specialized with my area. I do not teach all subjects (R 7).

A male teacher educator from the D University stated:

I use lecture method first. I deliver information through lecture method. After it we do activity in class. We make groups for discussion. We use discussion method. We make groups and ask them to perform activities after teaching a topic (R18).

Reasons for Using Traditional Approach

Majority of female teacher educators' explained that they prefer to use lecture method because it provides theoretical information to students, to cover course contents well in time and lack of resources. For example, a female teacher educator from the B University describing the reasons of using lecture method as; "[I] use lecture method to provide theoretical information and to cover course contents. Repeat lecture again and again unless students understand (R8)."

While another female teacher educator consider that topic requirement, lack of student knowledge and teacher expertise are the main reasons for her as, for instance,

Female teacher educator from the C University reported:

There are some topics which can't explain through modern methods. For these topics you have to use traditional methods in which experts are involve. Experts are teachers who involve. Lecture method is used in this way. Mostly students don't have know how about these topics. Teachers have to tell everything. Teachers are expert and active in lecture method (R13).

A female teacher educator from the A University described:

But these things how much implemented to the limited extent for example I switched these classes to lecture method when I started teaching in these classroom there was a multimedia in classroom. I started to show them slides but after one month the projector was ruined. It is not repaired till now(R 1).

Majority of the male teacher educators' stated the reasons of using traditional approach such as this increase student participation in class, easily asses student understanding and suitable keeping in view facts on the ground.

A male teacher educator from the D University stated:

I want more and more participation from the students in the class. So that they remain so active in the class. I give them work one day before so that we may discuss the topic in the class before the lecture (R15).

Similarly, another male teacher educator from the E University explained:

Because it's necessary to involve them otherwise they are blank. If we will not involve them through asking any question or by ask them to write on board they will obviously not involve. And their understanding level will also assess there. But there are some topics which need constantly lecture method (R 17).

A male teacher educator from the E University reported:

Keeping in view ground realities (student background, electricity issues, availability of multimedia, class space....) I deliver lecture to explain contents and provide materials to students for discussion (R 18).

Reason for Using Student Centered Methodologies

Few teacher educators' described that they use learner-centered methodologies because it is helpful in producing skilled-oriented learners, self-directed learners, lack of student interest in lecture method, increase student involvement and build their confidence, as well as increase teacher motivation and self-satisfaction.

A female teacher educator from the A University stated

It's the nature of discipline. As its business so until you will not polish the skills of your students like problem solving skill and situational leadership then learner remain passive. In addition, your discipline necessitate you practical things to make your students skillful (R5).

A female teacher educator from the B University expressed her view as "Students don't like lecture method because of no participation (R5)."

A female teacher educator from the D University identified:

[I] focus on practical learning and create real world situation in class to make them self-learner. The only real benefits of real learning is to enable the students to handle, to compete the realities / problems of real world. For me, teaching is not to teach single or two sentences and to translate English into Urdu (R14).

A female teacher educator from the C University reported:

For me, student active participation in class matter a lot. And through these strategies, student gain much confidence to speak. These pedagogies also facilitate and help out students in their day to day life (R13).

A female teacher educator from the A University explained:

When your students give you responses and reactions ultimately it increases your motivation and encouragement. When they perform activity it also gives you motivation. You feel happy that your students are giving responses and taking interest.

Actually when you teach them learning by doing. This gives worth to your work. We should focus on learning by doing and quality of education. After it you will get satisfaction by your way of earning (R5).

Application of these Methods while Teaching

A female teacher educator from the C University described about discussion method

Assign topic for group discussion and guide them how to prepare the content concerning 2 books and 3 to 4 articles at least. During group discussion where they face difficulty I elaborate (R13).

A male teacher educator from the F University explained about project method

Allocate project work ...for example this week assign video editing projects , they all are working on it and I assist where they face difficulty.....through videos they take interest and ask about different things and understand lesson (R20).

A female teacher educator from the A University stated about case studies

We use case studies, lectures, and discussions and practical projects are assigned to them. In our university there are 25 courses and in each course teacher has to give a practical. Like to do case study, they go to the field and collect data. They go to the industries, take data and analyze that data so that they may know what are industries and markets. That's why we motivate our other faculty to follow these methods more (R5).

Another female teacher educator from the A University stated about question answer method

Yes when they come after reading the questions they asked questions from me. They have made their proper notes and different kind of questions. I give them their answers (R11).

A female teacher educator from the B University stated about group work

I teach students through different ways as to make class more interactive or interesting. For example I am going to teach them Urdu. We are doing pedagogy of Urdu. We tell them about how to pronounce the Urdu. For this purpose I have to teach them spoken course. I divide them into eight groups. I have said some students to read stories. I have asked some to do role playing. I have asked them to write a story or an essay. I have asked different things to do in groups. This is actually their work (R10).

Discussion

The results of this study showed that the majority of teacher educators' prefer to teach students using the lecture method first, followed by the discussion method on second, and the question and answer method on third. However, only a small percentage of teacher educators' discussed using the demonstration method. Moreover, teacher educators' gave a number of reasons for their choices, including the following: effective to provide theoretical information to students; to cover course contents well in time; useful in absence of resources; topic requirement; lack of student knowledge; teacher expertise; increase student participation in class; ease in assessing student comprehension and suitable keeping in view facts on the ground.

Literature indicated that in social sciences lecturing is the standard method of instruction and the most prevalent justification for this method is its potential to regulate the delivery of content as well content coverage (Goffe & Kauper, 2014). Teacher centered approach emphasized on imparting subject matter knowledge and put correct information to the students. In the same way other researcher considered the importance of lecture and discussion methods in assisting the students to grasp the organized body of knowledge i.e. facts, concepts, principles & procedures (Eggen &

Kauchak, 2007 and Mutrofin, Degeng, Ardhana & Setyosari, 2017). Research studies also explained that teachers' often used question-answer methods, for example, the question-answer method is frequently used in the classroom because it allows teachers to assess their students' progress throughout the semester and mastery of course contents (Temizoz and Ozgun-Koca, 2008). Literature also explained that teacher in traditional classroom provide frontal information to student and consider her/himself authority in class. Teacher teaching is dependent on text book, reference book and piece of chalk in class. Teacher have more time to communicate with students and pay individual attention (Xu and Shi, 2018). Teacher have more control throughout the instructional process (Kaymakamoglu, 2017).

The findings also revealed that only 15 percent of female respondents said that they utilize learner-centered methodologies to teach students. These methodologies include collaborative learning and cooperative learning, group work, problem-solving methods, inductive methods, project work, and hands-on activities. Female teacher educators' have described that they use learner-centered methodologies because of the benefits it provides in terms of producing learners who are skilled-oriented and self-directed, lack of student interest in lecture method, increase student involvement and build their confidence, as well as increase teacher motivation and self-satisfaction. At the same time, the results of this study further suggested that only 15 percent of the respondents who are female teacher educators' and 5 percent of the respondents who are male teacher educators' also claimed that they instruct learners using mixed or blended approaches. There are multiple research evidence that claimed the constructivist approach has had a huge impact on the literature in both advanced and developing nations as it promotes active learning, student agency, various perspectives, and a culture of shared responsibility. This approach is also beneficial for helping learners to develop higher order thinking abilities, such as creativity, critical thinking, practical thinking, problem-solving, analysis, and assessment (Bhattacharjee, 2015 and Gray, 1997). According to Egmir & Celik (2019:438), constructivist theories put the learner at the core of all educational activities and emphasize their needs, interests, attitudes, and beliefs. The effectiveness of the teaching-learning process depends on the learner. Neutzling, Pratt, & Parker (2019) and Holmes (2019) noted that constructivist learning is prominent in higher education because it fosters confidence, creativity, and critical thinking. Moreover, research studies have shown that students from diverse parts of the world learn better when they share experiences and solve problems together (Wilson 1993 as cited in Narli, 2011 pg: 37). Furthermore, learners take part in active learning, where they have multiple chances to work together to learn (Malik, Din & Afzal, 2019). Learning outcomes from constructivist modes have a greater influence on learners than conventional and passive modes (Thompson, 2015 & Ugwuozor, 2020). There is a considerable body of data to support this claim that problem based learning lead to deeper, more persistent learning that can be applied to new contexts and issues (Dole, Bloom & Kowalske, 2016).

Limitations

This study findings leads to some interesting question for further research. First this study provide that only female teacher educators' were employing learner centered methodologies while teaching students, while need to know the outcomes of this study will be similar or different in other regions of the Punjab. Second, this study was conducted only in public sector universities of the central Punjab, there is ought to further incorporate the views of private sector universities. Third, only narrative/descriptive aspect of teacher educators' was included in this study, quantitative approaches might yield more generalized and meaningful results. Lastly, future study with a bigger sample might yield more exact results.

Conclusion

Results showed that most teacher educators' prefer to educate students via lecture, discussion, and question-and-answer. Few teacher educators' addressed utilizing demonstrations. Teacher educators' gave a number of reasons for their choices, including: effective to provide theoretical information to students; to cover course contents well in time; useful in absence of resources; topic requirement; lack of student knowledge; teacher expertise; increase student participation in class; ease in assessing student comprehension; and keeping in views facts on the ground. Very few female teacher educators utilize learner-centered pedagogies (collaborative, cooperative learning, group work, problem-solving approaches, inductive methods, and project work) because it produces skilled-oriented and self-directed learners, increases student engagement and confidence, and boosts teacher motivation and

self-satisfaction. Only 15% of female teacher educators and 5% of male teacher educators' said they use mixed or blended ways to educate.

Recommendations

The following recommendations are suggested based on the study results;

1. Male and female teacher educators' should get induction training in learner-centered approaches.
2. Teacher educators' require ongoing professional development to keep up with the ever-evolving needs of the modern classroom (21st century skills).
3. There should be incentives for female teacher educators' to improve/strengthen their methods.
4. A robust system of checks and balances is required to ensure that constructivist pedagogies are being put into practice by teacher educators'.

References

- Al-Amoush, S., Usak, M., Erdogan, M., Markic, S., & Eilks, I. (2013). Pre-Service and In-Service Teachers' Beliefs about Teaching and Learning Chemistry in Turkey. *European Journal of Teacher Education*, Vol. 36(4), pp. 464-479.
- Bhattacharjee, J. (2015). Constructivist Approach to Learning– An Effective Approach of Teaching Learning. *International Research Journal of Interdisciplinary & Multidisciplinary Studies*, 1(6), pp. 65-74.
- Bunyi, G., J. Wangia, C., M. and Limboro, C. (2013). *Preparation and Continuing Professional Development in Kenya: Learning to Teach Early Reading and Mathematics*. Unpublished document.
- Burris, S., & Garton, B., L. (2007). Effect of Instructional Strategy on Critical Thinking and Content Knowledge: Using Problem-Based Learning in the Secondary Classroom. *Journal of Agricultural Education*. Vol. 48 (1), pp. 106-116.
- Comfort, K., & Timms, M. (2018). A 21st Skills Lens on the Common Core Standards and the Next Generation Science Standards. In E. Care, P. Griffin, & M. Wilson (Eds.), *Assessment and Teaching of 21st Century Skills: Research and Applications*. Dordrecht: Springer.
- Dole, S., Bloom, L., & Kowalske, K. (2016). Transforming Pedagogy: Changing Perspectives from Teacher Centered to Learner Centered. *The Interdisciplinary Journal of Problem Based Learning*, Vol. 10 (1), Available at: <https://doi.org/10.7771/1541-5015.1538>.
- Darling-Hammond, L. (2010). Teacher Education and the American Future. *Journal of Teacher Education*, Vol. 61(1-2), pp. 35-47.
- Eggen, P. & Kauchak, D. (2007). *Educational Psychology: Windows on Classrooms*. New Jersey: Merrill Prentice Hall.
- Fullan, M. & Langworthy, M. (2014). *A Rich Seam: How New Pedagogies Find Deep Learning*. London: Pearson.
- Gray, A. (1997). Constructivist Teaching and Learning. Retrieved from https://psychology.wikia.org/wiki/Constructivist_teaching_methods dated on 29 June, 2022.
- Goffe, W., L. & Kauper, D. (2014). A Survey of Principles Instructors: Why Lecture Prevails. *The Journal of Economic Education*, Vol.45, pp. 360-375.
- Holmes, A. G. (2019). Constructivist Learning in University Undergraduate Programmes. Has Constructivism been Fully Embraced? Is there Clear Evidence that Constructivist Principles have been Applied to all Aspects of Contemporary University Undergraduate Study? *International Journal of Education*, Vol. 8(1), pp. 7-15.
- Kim, S., Raza, M., and Seidman, E. (2019). Improving 21st Century Teaching Skills: The Key to Effective 21st Century Learners. *Research in Comparative & International Education*. Pp. 1-19.
- Kaymakamoglu, S., E. (2017). Science Teachers' Conceptualizations and Implications for the Development of the Professional Development Programs. *Eurasia Journal of Mathematics, Science and Technology Education*, Vol. 13(7), pp. 3301-3314. <https://doi.org/10.12973/eurasia.2017.00718a>
- Kelentrić, M., Helland, K., & Arstorp, A. (2017). Professional Digital Competence Framework for Teachers. The Norwegian Centre for ICT in Education.
- Keiler, L., S. (2018). Teachers' Roles and Identities in Student-Centered Classrooms. *IJ STEM Ed*, Vol. 5 (34), DOI,<https://doi.org/10.1186/s40594-018-0131-6>

- Lowe, G., M. & Prout, P., F. (2019). Reframing Teacher In-Service Training in Kenya: Recommendations from the Literature. *African Education Review*, Vol. 16(3), pp. 54-66.
- Laar, V., E, Deursen, Dijk, V., J, and Haan, D., J. (2017). The Relation between 21st Century Skills and Digital Skills: A Systematic Literature Review. *Computers in human behavior*, Vol. 72, 577-588.
- Markic, S., and I. Eilks. (2008). A Case Study on German First Year Chemistry Student Teachers Beliefs about Chemistry Teaching, and Their Comparison with Student Teachers from Other Science Teaching Domains. *Chemistry Education Research and Practice*. Vol.9 (1), pp. 25–34.
- Malik, H., D., Din, M., and Afzal, S. (2019).Constructivism in the Pedagogical Practices of the University Faculty. *Global Social Sciences Review (GSSR)*. Vol. 4, (1), pp. 172 – 180.
- Mutrofin, Degeng, N., S., Ardhana, W., & Setyosari, P. (2017).The Effect of Instructional Methods (Lecture-Discussion versus Group Discussion) and Teaching Talent on Teacher Trainees Student Learning Outcomes. *Journal of Education and Practice*, Vol. 8 (9), pp. 203-209.
- Moustafa, A., Ben-Zvi-Assaraf, O., & Eshach, H. (2013). Do Junior High School Students Perceive their Learning Environment as Constructivist? *Journal of Science Education and Technology*, Vol. 22(4), pp. 418–431.
- Neutzling, M., Pratt, E., & Parker, M. (2019). Perceptions of Learning to Teach in a Constructivist Environment. *The Physical Educator*, Vol. 76 (3), pp. 756-761.
- Narli, S. (2011). Is Constructivist Learning Environment Really Effective on Learning and Long-Term Knowledge Retention in Mathematics? Example of the Infinity Concept. *Educational Research and Reviews*. Vol. 6(1), pp. 36-49.
- Patel, B., H. & Thakkar, A. (2017). Edmodo : ICT Based Collaborative Learning Tool in Promoting Professional Learning Platforms. Pp. 1–6.
- Persaud, C. (2022). 11 Teaching Styles Designed to Increase Engagement. Available at <https://tophat.com/blog/teaching-styles/> Retrieved from 28 June, 2022.
- Senturk, C. (2020). Effects of the Blended Learning Model on Pre-Service Teachers' Academic Achievements and Twenty-First Century Skills. *Education and Information Technologies*, Vol. (26), pp-35-48.
- Teo, T., Unwin, S., Scherer, R. & Gardiner, V. (2021). Initial Teacher Training For Twenty-First Century Skills in the Fourth Industrial Revolution (IR 4.0): A Scoping Review. *Computers & Education*, Vol. (170), pp. 1-21.
- Tamim, S., R. & Grant, M., M. (2013). Definitions and Uses: Case Study of Teachers Implementing Project-Based Learning. *Interdisciplinary Journal of Problem-based Learning*, Vol. 7(2), pp. 72–101. <https://doi.org/10.7771/1541-5015.1323>
- Temizoz, Y., & Ozgun-Koca, S., A. (2008).The Instructional Methods that Mathematics Teachers' Use and Their Perceptions on the Discovery Approach. *Egitim ve Bilim*, Vol. 33(149), pp.89-103.
- Thompson, D., S. (2015). Benefits of Constructivism. Boise State University College of [http://deborahthompson.weebly.com/uploads/2/6/4/7/26477939/dthompson_edtech504_benefits_of_constructivism_\(final_paper\).pdf](http://deborahthompson.weebly.com/uploads/2/6/4/7/26477939/dthompson_edtech504_benefits_of_constructivism_(final_paper).pdf)
- Ugwuozor, F., O. (2020). Constructivism as Pedagogical Framework and Poetry Learning Outcomes among Nigerian Students: An Experimental Study, *Cogent Education*, Vol. 7 (1), 1818410, DOI: 10.1080/2331186X.2020.1818410
- Wang, D. (2011). The Dilemma of Time: Student-Centered Teaching in the Rural Classroom in China. *Teaching and Teacher Education*, Vol. 27(1), pp. 157-164. <http://doi.org/10.1016/j.tate.2010.07.012>
- Xu, Z. & Shi, Y. (2018). Application of Constructivist Theory in Flipped Classroom — Take College English Teaching as a Case Study. *Theory and Practice in Language Studies*, Vol. 8(7), pp. 880.