Teachers' Perspectives Towards Using STEAM Approach in English Classrooms

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Abstract:

Objectives: The aim of this study is to see the perception of teachers towards STEAM approach in teaching students. The research asserts towards different views teachers have created for STEAM in educating students. This study highlights the awareness of STEAM pedagogy, and the challenges they may face during instructional implementation. Although, it is difficult to implement STEAM successfully, but it is a useful tool in teaching students' practical knowledge and skills.

Methods: The present study is adopted using quantitative research method. The sample size selected from total population of teachers in Bahawalpur district were 50 in total. There were 25 males and 25 females who were selected through convenient sampling technique. Self-developed inventory was used as research tool to collect data from participants.

Results: The findings of the study showed that the teachers are aware of using STEAM in classrooms and it greatly helps them to teach applied skills and knowledge. The results show that although teachers felt difficulty in evaluation and assisting students, they still feel that STEAM is a multi-disciplinary approach which is a great way to utilize full potential of students and makes teaching and learning exciting.

Conclusions: The cumulative discussions that were found in the light of the study concluded that teachers wanted to implement STEAM in the classrooms, but they also wanted proper facilities and structure for applying this approach successfully as it requires training and resources.

Keywords: STEAM pedagogy; ESL Teaching; Teachers' perceptions; Child psychology.

1   Introduction

Learning is a creative process that enables an individual to inquire about the unknown. In the 21st century, learning is not just acquiring knowledge but also developing hard and soft skills to do multiple tasks at one time. However, the STEAM approach not only allows students to learn better but also develops applied skills and logical reasoning. A multidisciplinary method combines science, technology, engineering, arts, and mathematics. The STEAM approach is emerging as a new trend for teaching and preparing students to fill in advanced-level professions. The accumulation of the five disciplines plays a vital role in preparing the young generation to be productive and assist them in facing global and economic changes so that they are successful in their professional life. STEAM works offer innovative means to do things in arts and areas of STEM with the full liberty and critical approaches to teaching that cannot be done with economic interests (Mejias et al., 2021).

STEAM is an interdisciplinary approach for educating students using a combination of five subjects to establish interaction between these disciplines and develop creative skills of problem-solving and critical thinking (Space Foundation, 2023). It aims to teach students, creativity and think logically at the same time using their other prospective capabilities. Although the implementation of STEAM in the classroom is to some extent challenging with the right provision and assistance it becomes easier to teach students and help them to succeed in future careers. STEAM brings several advantages to the education system as it prepares the young generation to become leaders of the future and contribute to the benefit of the nation.

Pakistan enjoys multifaceted pedagogical revolution regarding ESL learning and teaching where English was once taught as foreign language though it has long been established as second language of the country. However, teaching approaches towards English instructions have always in debate (Zafar et.al., 2021). It has come into the researchers' knowledge that STEAM based pedagogy is not much in practice in country's ESL classrooms. This study has identified the instructional gap and attempted to address it by highlighting English teachers' perspectives towards STEAM pedagogy if it is applicable, useful and benefitting for the teaching and learning continuum.

1.1 Rational of the Study

This paper intends to highlight the perspective of teachers towards STEAM approach. The purpose of the study was to see how teachers perceive STEAM in teaching students and how they can use different activities to implement STEAM productively. The study reflects teachers' ideas and views regarding the use of this approach and how it is helping instructors to improve their teaching experience and making learning more exciting for students.

1.2 Research Questions

- What are English teacher's perspectives towards STEAM approach?
- To what extent are teachers aware of incorporating STEAM in English curriculum?
- How can English Teachers use STEAM in teaching English Language skills?

1.3 Significance of the Study

This study was conducted to see the perception of teachers towards STEAM approach in teaching student's English curriculum. The intended study showed how teachers can effectively use STEAM in their teaching approach. The education systems still face barriers such as training qualified teachers that are an addition to STEAM and other instructional approaches. This study tries to discuss teacher's perception and attitudes towards STEAM (Li & Chiang, 2019). This research is the basis for future studies as well. The findings may well be used to conduct other similar studies on teacher's perspective towards STEAM and how new approach is being used in another core curriculum.

2   Literature Review

English is the most common language spoken as a lingua franca around the world. It has become necessary to have a command of the language to equip the required skills in the global market. The 21st century is creating new pathways for individuals to secure top-level positions but at the expense of having competency and versatility to be able to compete with one another (Ozturk, 2021). STEAM is the new way of teaching, which is 21st century skills required to meet labor demands and careers. The use of five different subjects makes it easier for students to inculcate practical skills and

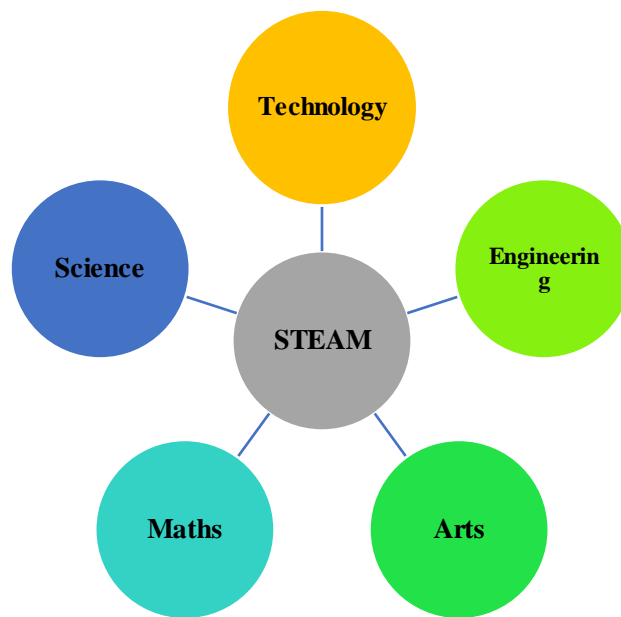knowledge that can benefit them when working in the field.

Figure 1: Components of STEAM

Ozturk (2021) conducted experimental study in which both STEAM activities and English language learning activities were integrated to teach young students. The activity was designed similarly to CLIL (Content and Language Integrated Learning) but relevant to STEAM activities in which all five disciplines collaborated in teaching. The students were shown a video on How a Caterpillar becomes a Butterfly. The objective of the video was to discuss what other life cycles of living things students know. By using the STEAM approach, the teacher first explains what bugs and pests are. The difference between them (Science). She further asks them to write bugs and pests, separately on a paper and number them. The teacher then makes groups of students and opens a digital grouping named, "Our Bug Friends" (Technology). Furthermore, the teachers tell students how to keep insects safe and ask them to create their own insect traps (Engineering). Teachers read a story and show it on a smart board by Susan Carraretto, 'The Pest Detectives', she asks questions about it. She then gives two options whether to draw a bug or create it using waste material (Arts). Lastly, she shows them some multiplication exercises and gives handouts to solve them; resultantly students color the handouts according to the number.

The outcome of the activity indicated that students enjoyed learning English and the results showed that the study was successful in teaching all disciplines collaboratively. The conclusion derived from the study suggested that ESL teachers need to implement STEAM in English classroom practice to motivate and develop the interest of students in learning language (Ozturk, 2021).

STEAM is a process that students must go through come up with a solution to a given problem. It is led by the Engineering Design Plan which is a fixed stepwise procedure. It was developed to boost creativity and encourage students to do experimentation while working as a team. Firstly, they must discuss a problem, brainstorm it, draw, and plan materials create the model, and improve it (Emine, 2020).
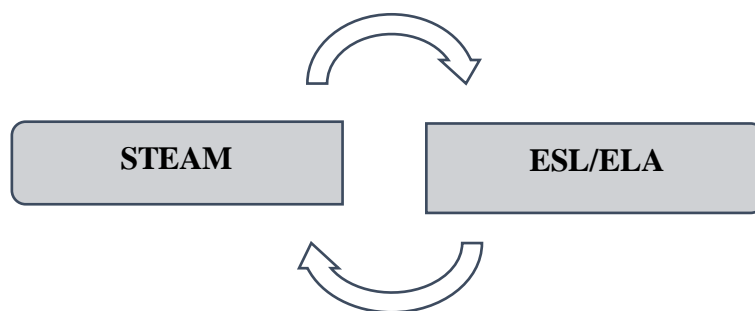
Figure 2: STEAM and ESL

2.1 Implementing STEAM in Classroom

STEAM is a broad term and has no specific boundaries when and how it is used in the education system. It depends on the schools and teachers how they teach through STEAM and what students are learning. STEAM is not limited to a single person (Arts integration and STEAM, 2023). The purpose of STEAM is to induce curiosity among learners and entice them to come up with queries to solve problems using their true ideas. It is an integrated approach to learning which can be combined with any particular subject class. However, STEAM cannot be implemented easily in any class. The instructor of STEAM has to teach with integrity, needs to have qualified, and professional skills to use in the medium of instruction. To assure teachers gain the required expertise to teach there are STEAM conferences and courses available for STEAM instructors so that they get to know how STEAM works in the classroom and where to apply it (Art integration and STEAM). The teachers have to work on setting curricular standards for STEAM and create some evaluation criteria that combine all the disciplines. Lesson planning is also an important task and must be taught with integrity. Therefore, it can justifiably be commented that STEAM is not only just a curriculum but also a whole education system that involves preparation and maintaining standards of training to successfully implement STEAM.

ESL teaching methodology in Pakistani classrooms is an umbrella issue due to various cognitive, psychological, social, and instructional difficulties. Pakistani teachers are non-native English speaking teachers (N.NEST) and they most frequently incorporate traditional methods of teaching (Zafar et.al, 2021). This study highlights the importance of comparatively innovative instructional strategy i.e. STEAM. Implementing STEAM in classrooms requires great effort. However, there are numerous ways the instructor can successfully implement STEAM. There needs to be a prearranged lesson plan that enables project-based learning and requires using the internet or other technological devices to support the STEAM activities (SAM Blog, 2021). Realistic learning is part of STEAM teaching approach that allows the students to discover, debate, create, and build projects in real-world situations which develops the creative skills and other skills related to STEAM. STEAM does not require one particular technique to teach but it works for every kind of student and any kind of classroom. It not only paves the way for new methods to be incorporated into the curriculum but also enhances the contextual syllabus. The purpose of STEAM is to invoke project-based learning using a realistic approach.

3   Methodology

The study aims to discover the perception of teachers towards STEAM. It examines how STEAM pedagogy is implemented in classroom. The researcher carried out quantitative research to see how teachers perceive STEAM in teaching students. The total population was selected from three private school colleges of Bahawalpur district. The institutions were located in the city of Bahawalpur. The sample size of teachers was 50 in total, which was selected using the convenience sampling method. Questionnaires were used to gather information from teachers. The sample was selected using the convenience sampling method. There were a total number of 25 females and 25 males in the sample size.

A self-developed Reflective Functional Questionnaire (RFQ) was used as data collection instrument for this study. The validity and reliability were ensured during selection, development, validation and administration of RFQ. The tool was piloted well before its administration along with obtaining its statistical

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reliability with Cronbach alpha value 0.83. The teachers were requested to fill in a questionnaire that were related to STEAM. It also enquired about their perception regarding STEAM. The questionnaire was developed using Adopt- Adapt strategy to design statements. It showed the interests, problems, and perceptions of teachers regarding the STEAM approach in teaching. There were 20 questions in the questionnaire consisting of close-ended questions. The questionnaire had four sub categories each consisting of five questions.

Table 1: Questionnaire categories

Categories	Statements
Teacher's awareness and understanding of STEAM approach	5
Implementing STEAM approach and its impact in classroom	5
Attitude towards teaching through STEAM	5
Teacher challenges regarding STEAM	5
Total	**20**

4   Data Analysis

Data analysis is the most important step in research as it uses raw data collected to turn it into useful information. It summarizes the data and interprets it into logical and analytical information to determine trends and relationships (University of Pretoria, 2024). This study analyzed data using SPSS.20 by running descriptive statistic technique. There was total 20 statements, which were divided into 4 categories.

Table 2: Results of Teacher's awareness and understanding of STEAM approach

Statements	SDA	DA	N	A	SA	Mean
I am aware of using STEAM approach in teaching students.	8%	4%	12%	40%	36%	3.92
I have clearly defined goals to teach STEAM techniques to students.	8%	4%	20%	36%	32%	3.80
I am familiar with STEAM - how it focus on practical activities that are related real world situations.	6%	6%	16%	48%	24%	3.78
I am familiar that students work in groups to carry out a particular task.	6%	10%	14%	48%	22%	3.78
I know that it helps to improve student communicative skills.	6%	6%	20%	42%	26%	3.76

SDA: Strongly Disagree; DA: Disagree; N: Neutral; A: Agree; SA: Strongly Agree
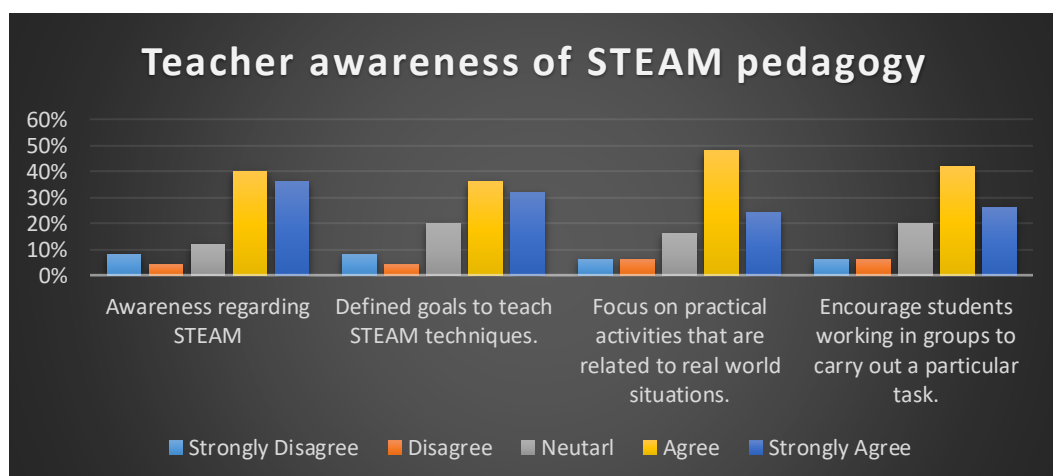

Figure 3: Teacher awareness of Steam Pedagogy

Table 3: Results of implementing STEAM approach and its impact in classroom

Statements	SDA	DA	N	A	SA	Mean
In STEAM based classroom students engage in meaningful learning activities.	4%	6%	16%	46%	28%	3.88
In class, projects of imaginary building are created using physical objects.	2%	12%	16%	48%	22%	3.78
I instruct students to explore materials used in structures and mechanism.	0%	14%	14%	54%	18%	3.76
I often practice experimental and creative engineering activities in class.	0%	10%	22%	58%	10%	3.68
I try to use innovative ideas to design tasks for young minds.	0%	10%	14%	54%	22%	3.88

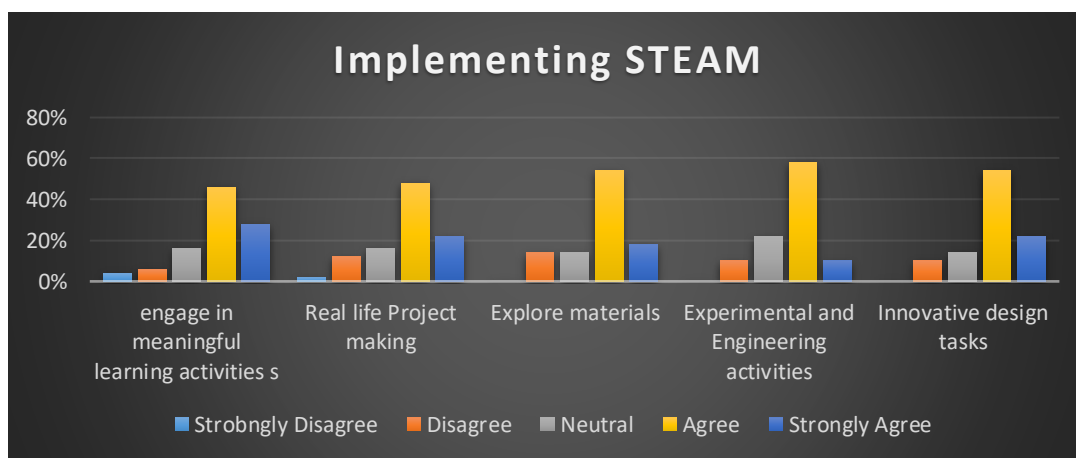SDA: Strongly Disagree; DA: Disagree; N: Neutral; A: Agree; SA: Strongly Agree

Figure 4: Implementing STEAM

Table 4: Results of Attitude towards teaching through STEAM

Statements	SDA	DA	N	A	SA	Mean
I am internally motivated when teaching students through STEAM approach.	0%	10%	30%	30%	30%	3.80
I am able to diminish class anxiety in classroom.	0%	10%	20%	52%	18%	3.78
I am interested in working on assignments and projects that are complex.	0%	14%	20%	36%	30%	3.82
I am able to forge positive professional relationships with my students and work.	0%	12%	20%	44%	24%	3.80
I understand how to align curricular standards and teach students with integrity.	0%	12%	20%	48%	20%	3.76

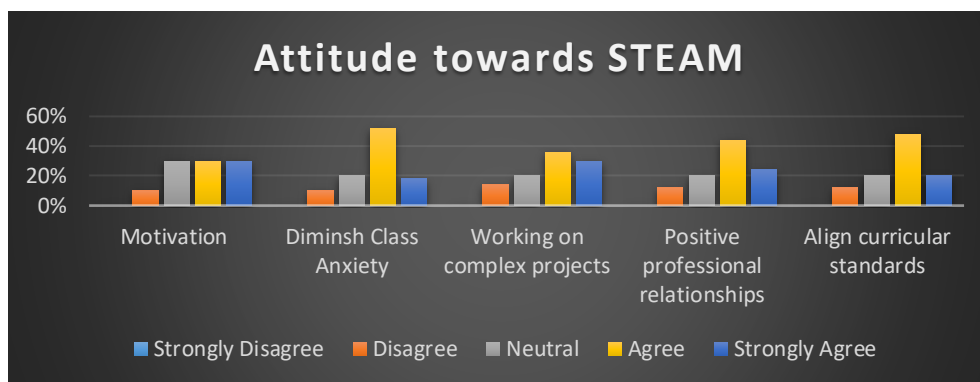SDA: Strongly Disagree; DA: Disagree; N: Neutral; A: Agree; SA: Strongly Agree

Figure 5: Attitude towards STEAM

Table 5: Results of Teacher challenges regarding STEAM

Statements	SDA	DA	N	A	SA	Mean
I feel difficulty in evaluating students based on activities.	0%	4%	16%	32%	48%	4.24
I feel difficulty in facilitating students when working in projects in groups.	4%	2%	12%	38%	44%	4.16
I am unable to communicate dissimilar designs to students.	4%	0%	22%	28%	46%	4.12
I feel nervous to plan and imbed STEAM in the curriculum.	6%	6%	10%	32%	66%	4.06
I would need some additional professional development to help me implement STEAM more regularly in my classroom.	0%	2%	12%	34%	52%	4.36

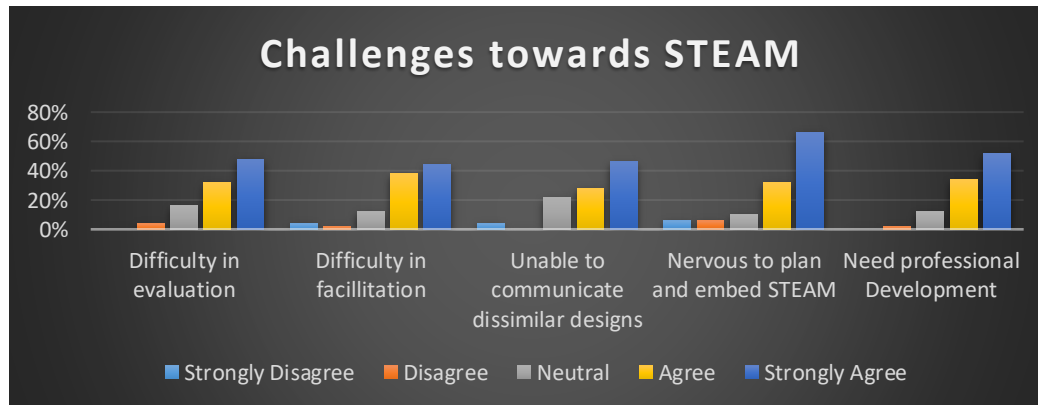SDA: Strongly Disagree; DA: Disagree; N: Neutral; A: Agree; SA: Strongly Agree

Figure 6: Challenges towards STEAM

5 Findings and Discussion

A survey of teachers revealed that 76% (Strongly agree and agree) were aware of the STEAM approach in teaching, with 36% strongly agreeing, while 12% remained neutral. Teachers generally support group work for specific tasks, with 70% agreeing and 22% strongly agreeing. Most teachers believe STEAM boosts student communication skills, with 68% agreeing and 26% strongly agreeing. The majority of teachers were aware of the STEAM approach in teaching students, were familiar with group work.

The study reveals that 76% (Strongly agree and agree) of teachers believe that STEAM classrooms involve meaningful learning activities, such as designing a house. Around 70% of teachers believe that projects of imaginary building are created using physical objects in the class. Around 72% of teachers instruct students to explore materials used in structures and mechanisms. About 68% of teachers practice experimental and creative

engineering activities in class. In terms of task design, 76% of teachers use innovative ideas. While 60% expressed internal motivation when teaching through the STEAM approach. About 70% (Strongly agree and agree) of teachers claim to be successful in reducing class anxiety. About 66% of teacher's express interest in complex assignments and projects. Positive professional relationships are believed by 68% of teachers. However, 88% of teachers find it difficult to evaluate students based on activities. Additionally, 82% of teachers face difficulties in facilitating group projects. Communication of dissimilar designs is a significant challenge for 74% of teachers. Improper planning and embedding STEAM in the curriculum is felt by 78% of teachers. A large majority of teachers (86%) express the need for additional professional development to implement STEAM more regularly in the classroom. This indicates a strong desire for further professional development among teachers. Overall, the STEAM approach is seen as a valuable tool for teaching and learning.

The results of the study further showed that teachers were positive in using and implementing STEAM in classrooms. The teachers were aware regarding STEAM; and how it is helping students throughout the world to polish their applied skills. STEAM approach is a multi-disciplinary approach that aids students to develop all kinds of professional abilities in them. The findings revealed that teachers were greatly satisfied in teaching through STEAM activities that were related to real life. In addition, it made them to work together with students in making projects and become a guider rather than instructor. It likewise motivated them to overcome their anxiety while teaching. There were also various issues raised by teachers such as it required training to effectively use STEAM in teaching. They felt difficulty in evaluation of students as it was only based on activities and no theoretical work was done like exams or tests to assess them. Besides this, they faced problem in planning and embedding lessons related to STEAM activities, which requires much effort from teachers. The teachers felt the need for collaboration with fellows, professional development, quality in subject planning and experiences can really help in implementing STEAM (Margot & Kettler, 2019).

5.1 What are English teacher's perspectives for teaching English language towards STEAM?

The outcome of the current study showed that language proficiency and STEAM themes are linked with teachers of English more and more. The result revealed that teachers had positive opinion regarding STEAM approach; and how it had been a blessing for many teachers who were struggling to teach well and use modern techniques of teaching. Teachers have felt that it has made teaching more interesting and enjoyable. They see language as a tool for expression and study, and they value the multidisciplinary links that exist between STEAM and English (Ramey-Gassert, et al., 1996). They support project-based learning, which involves group projects and practical applications of language skills together with critical thinking. Teachers also value the chance to introduce students to practical uses of language in STEAM situations, such as comprehending technical reports, technical manuals, and scientific materials (Moje, 2007). Additionally, they see STEAM integration as a means of developing critical literacy abilities that help students find and assess material in various subjects (Larmer & Mergendoller, 2010). In collaborative environments, where students frequently work in teams on STEAM projects, communication skills are also highlighted (Bequette & Bequette, 2012). Furthermore, they consider STEAM integration as a way to improve students; global competency by promoting cross-cultural awareness and getting them ready for a workforce that is increasingly globalized (Zhao, 2019). Learning a language can benefit from a wide range that is created by combining literature with STEAM subjects. The study highlights the necessity to train teachers and provide them with adequate facilities that are a requirement of any educational approach (Kim. S.W, Lee. Y, 2018). Nonetheless, studies that concentrate on the viewpoints of English teachers in this particular setting could provide more insightful information (Moje et al., 2008). The findings of this study explicated that teachers are psychologically prepared and internally motivated to adopt new teaching methodologies. These results advocate the findings revealed by Zafar et al (2021) who highlighted the importance of Oxford Reading Circle textbooks in Pakistani English classrooms.

6   Conclusion

Most teachers are familiar with the STEAM approach, its practical activities, and its ability to improve student communicative skills. They

engage in meaningful learning activities, align curricular standards, and teach students with integrity. However, they face difficulties in evaluating students, facilitating group projects, communicating designs, and planning STEAM in the curriculum. The teachers stated the need for proper training and provision of resources that are necessary for implementing STEAM in classrooms. Based upon the salient findings obtained in the present study, it is highly recommended to pursue experimental researches to examine the impact of Steam pedagogy on English teaching skills of students at primary, elementary, secondary and graduate level. Furthermore, it is suggested to curriculum designers to prepare teaching toolkit and lesson plans according to Steam based instructional plans. Through using this pedagogy, students are likely to enhance their English proficiency with interest, motivation and positive attitude.

References:

Arts integration and STEAM, (2023). *What is STEAM Education? The definitive guide for K-12 schools*, https://artsintegration.com/what-is-steam-education-in-k-12-schools/

Bequette, M. B. & Bequette, K. A. (2012). Using Project-Based Learning to Teach Engineering Design to Elementary Bioengineering Students. *Advances in Engineering Education*, 2(2), n2.

Emine, (2020), STEM/STEAM in ESL language learning – part 1, https://teacherteachtheteacher.com/2020/06/02/stem-steam-in-esl-language-learning-part-1/

https://library.up.ac.za/c.php?g=485435&p=4425510#:~:text=Data%20analysis%20is%20the%20most,determine%20patterns%2C%20relationships%20or%20trends.

Kim, S.W. & Lee. Y. (2018). An investigation of teachers' perception on STEAM education teachers' training program according to school level. *Indian Journal of Public Health Research and Development*, 9(9), 664, https://doi.org/10.5958/0976-5506.2018.01076.8

Larmer, J., & Mergendoller, J. R. (2010). *Project Based Learning Handbook: A Guide to Standards-Focused Project Based Learning for Middle and High School Teachers*. Buck Institute for Education https://www.queensu.ca/teachingandlearning/modules/students/04_what_is_learning

Li, W. & Chiang. F.K. (2019). *Preservice Teachers' Perceptions of STEAM Education and Attitudes Toward STEAM Disciplines and Careers in China*. Advances in STEM Education ((ASTEME)), https://link.springer.com/chapter/10.1007/978-3-030-29489-2_5

Margot, K.C. & Kettler, T. (2019). Teachers' perception of STEM integration and education: a systematic literature review. *International Journal of STEM Education*, 6, https://doi.org/10.1186/s40594-018-0151-2

Mejias, S., et al., (2021). The trouble with STEAM and why we use it anyway. *Science Education*, https://doi.org/10.1002/sce.21605

Ozturk, O. (2021). *STEM in English Language Teaching, CCAL- EFL Teacher, Scientix Ambassador/ National Geographic Certified Teacher*, A Double Blind Peer Reviewed & UGC indexed Journal (S. NO.103 & Journal No.45473), English Language Teachers' Association of India, https://sites.google.com/view/theeltpractitioner/archive/2021/volume-ix-number-1/3-stem-in-english-language-teaching,

Ramey-Gassert. L. et al, (1996). An innovative model for collaborative reform in Elementary School Science Teaching. https://www.tandfonline.com/journals/uste20

SAM Blog, (2021). *STEAM Learning in the Classroom: 5 Methods for Authentic STEAM Learning Experiences*. https://samlabs.com/us/teaching-steam-classroom-5-ways-create-authentic-learning-experiences/

Space Foundation (2023). *What Is STEAM Education and Why Is It Important? Space Foundation Editorial Team*. https://cie.spacefoundation.org/what-is-steam-education-and-why-is-it-important/

University of Pretoria. (2024). *Research Guide: Data analysis and reporting findings*.

Zafar, T., Lodhi, M.A. & Iqbal, S. (2021). Teaching English reading skills through Oxford Reading Circle (ORC) textbook among ESL learners of grade 8. *International Journal of Childhood, Counselling and Special Education (CCSE)*. 2(2), 85-102 https://doi.org/10.31559/CCSE2021.2.2.2

Zhao, Y. (2019). *What Works May Hurt: Side Effects in Education. Teachers College Press*, https://link.springer.com/article/10.1007/s10833-016-9294-4