STEM in english language teaching at high schools in central java indonesia: opportunities and challenges

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STEM in english language teaching at high schools in central java indonesia: opportunities and challenges

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Abstract. STEM as an educational enterprise has grown in importance during the past 10 years, articularly in the USA, UK, and other Anglo-Saxon countries [1] . The problem of this study is that what are the opportunities and challenges of implementing STEM in English language teaching at high schools in central java? The research design was a qualitative study using a sheet of structured interview which was distributed to teachers around at district area like; *Pati, Semarang, Demak, Jepara*, and *Ungaran*. There were 13 teachers who collected back the instrument and giving the data through their empirical involvement. The participants were the teachers from 6 state high schools and 7 private high schools. In collecting the data, the writers send the questions through email to the group of teachers' organization and ask them to participate by answering it. The results are; the opportunities of using STEM that is teachers opportune to apply; 1) social media as a tool in teaching media, 2) vlog in supporting a topic of 'describing a person/a thing', 3) direct observation onto the nature, 4) short video in conversation, 5) elaborating some texts genres. On the other hand, there are some challenges like; teachers are facing; 1) less skill in using technology, 2) less facility at schools, 3) no socialization about STEM, 4) less teaching media used, 5) less motivation to grow. Writers also declare to recommend teachers to elevate and upgrade their skill in the usage of technology, collaborating nature as the teaching and be aware with the current teaching approach in order to be able to get in the students' need in the current era.

1. Introduction

The globalization in education concerning teaching and learning activity cannot be denied from the influence of the growing on current technology now on. In this 21st century teachers are supposed to do more productive in the classroom rather than giving lecturing in front of the students. Teachers also should build the culture of literacy awareness in the environment of schools to get involve in enhancement of education internationally especially at high schools. In the recent years, the education field of teaching was acknowledged by STEM (science, technology, engineering, and mathematics) that it is a kind of approach to teach students using those for elements integrated in teachers' classroom using their environment of school, field of work, community and universe as the media of learning [9]

Teaching English language using STEM at high schools in central java Indonesia is a rising educational discourse since it is a very rare implemented by English teachers in fact. They still feel strange with this STEM because they are not familiar with this approach and do not know how to implement it. STEM is one of approaches to teach science (nor language), technology, engineering, and There are some theories concerning on the STEM concepts which are declared by some experts, [8] notes that:

> *Some people define any activity that involves any of science, technology, engineering or mathematics as a STEM activity; others argue that intrinsic to the concept is some linking of two or more of the component areas of learning, and that real STEM must be more than the sum of its parts (p. 41).*

Mathematics, so that English teachers do not feel that they need its approach instead. Anyhow, STEM is actually melted in any teaching approaches in any field of teaching otherwise in designing the curriculum 2013 inserted in basic competency and teaching and learning indicators.

Factually, STEM approach is still a new paradigm in teaching especially English language lesson at the high schools in central java Indonesia. English teachers mostly do not know this approach since they do not get this upgrading workshop or training knowledge from the government of minister of education and culture. [3] elaborate for the awareness of this education and instruction in STEM pedagogy through an interdisciplinary approach in English language teaching. Gomes thinks that using STEM through interdisciplinary lessons will strengthen students to get the integrated lessons for their future life skills.

2. Research problems

The writers come to the real condition and factual phenomena that there is a current issue in teaching methodology which is called STEM. Based on that reality, we appear the two research problems are; 1) What are the opportunities of the use of STEM in English language teaching? And 2) What are the challenges of the use of SETS in English language teaching? Hopefully this result of research can lighten the paradigm of English teachers at those high schools in central java and in Indonesia in general.

3. Theoretical frameworks

The exist curriculum of Indonesia is curriculum 2013 which is familiar as called *Kurtilas*. Then The last decade has witnessed several concerted movements towards an integrated science, technology, engineering, and mathematics (STEM) is introduced by [7] . To respond this new approach, teachers feel hard to catch the purpose of this STEM beyond the language teaching. Since then STEM is introduced as the global teaching approach which is pioneered by united of America and British, consequently in Asia there are many countries to try to adjust it into the classroom. As we know that STEM are still rare used in Indonesia because we still use the *Kurtilas* curriculum as the mandate of government in any level of schools.

STEM education is not a well-defined experience, but it does involve similar hallmarks within the design and implementation [4]. In English language teaching is it part of the approach which is able to be used in collaboration with the technology, nature in once hand. But then for the science, engineering and math they can be involved in teaching the texts types only. [6] conducted an extensive review of published literature, analyzed documents of state content standards, and consulted with experts in STEM fields in order to determine the ways teachers utilize STEM

education in their classrooms. We believe that this STEM can be adapted in the content standard of topic lesson by adjusting the related topics which are viewing the students' enthusiastic in the classroom.

After having some readings, writer can have a framework of elements in STEM like: (a) the little touch of math and science content, (b) student-centered activity, (c) giving fully motivation, (d) a glance touch of engineering, (e) project and problem based learning, and (f) work in a team. The writers can say that actually teachers already have done those steps in their daily teaching routine. Those parts are the cycle of classroom activity which is asked by the *Kurtilas* curriculum although some other parts are not familiar for teachers because they think that they do not need to collaborate other lesson like, mathematics and science into their real English language teaching.

4. Methodology

I used a qualitative approach in running the design of the research since it was to describe a kind of a very general public teachers' perspectives towards the both things; opportunities and challenges of the implementation of STEM in teaching English in the classroom. Participants of the study was 13 high schools' teachers who teach at state and private high schools in central java, Indonesia. The instrument of the study was a sheet of structured interview which has two major questions along with the opportunities and the challenges which is needed 10 answers for each item.

There were some techniques in collecting the data; firstly, having a communication with the group of teachers' organization around central java province, secondly distribute the instrument through the what's up and email, thirdly asking them to answer and send it back to the writers. In analyzing the data, the writers used thematic analysis which is introduced by [2]. who notes that thematic analysis is a method for identifying, analyzing, and reporting themes (or patterns) within the data. Here are some steps in analyzing the data; writers identified the result of the interview; name of participants, name of schools and regency/district of the participants, as well as the completeness of the questions. Then we analyzed the data through having 65 answers on opportunities and 65 answers on challenges of using STEM. In analyzing them writers have taken the big five of the most teachers assumed towards the both sides. Reporting was the last session that writers did by making it into a scientific writing in order to be published in international journals.

5. Research results and discussion

Based on the result of the research, we can declare that the findings are getting the big five teachers' perspectives towards the opportunities of using STEM approach in English language teaching at schools in central java Indonesia, they are; 1) teachers are able use the social media as the teaching media in implementing the topic lesson of 'invitation', 2) teachers are able to use the vlog to apply the topic lesson of 'describing a thing/ a person, 3) teachers ask students to observe the nature through the topic lesson of 'exposition', 4) teachers are able to empower students to make a short video dealing with the nature English conversation in a certain place, 5) teachers are able to give some texts related to STEM with the current issues.

On the other hand, these are the challenges belonged by teachers in using STEM at schools teaching English as follows; 1) there are many teachers who do not understand and get familiar

with STEM, 2) the teachers' literacy on using technology is still low, 3) there is no a firmed standardized assessment for STEM, 4) teachers' feel difficult in merging the STEM into the implementation of topic lesson, 5) the teachers' motivation is still low.

Through those findings, we can discuss that the opportunities of using STEM at high schools in central java Indonesia to teach English is that actually some teachers have applied STEM in their teaching and learning activity, but then they do not know how to integrated the elements of STEM into topic of lesson, even though they can actually have merged some topics but not for all topics on in the same competency based targeted. Then it can be elaborated like that teachers are able to implement STEM in their classroom at high schools for introducing text genres and short functional texts. Opposite with that, the writers picturize the challenges faced by teachers that they need more struggle to fill STEM into the real application in the classroom. Here are some consideration and challenges for teachers in applying STEM as follows; 1) Teachers need to upgrade their knowledge and skill in using the current technology, 2) the facility of teaching and learning in the schools should be well high tech, 3) there should be a socialization on STEM approach for teachers in local and general scope, 4) teachers should be a raw model to maximize the nature as the media of teaching, 5) and the last is that teachers should be raised their motivation concerning with the something new approach dealing with the teaching method.

6. Conclusion and Recommendation

In general, speaking I can conclude that there are some points that the writers can appear like; first the most dominant in teachers' perspective towards the opportunities of using STEM is the usage of the current technology and merging the nature as the teaching media in the English language classroom in high schools. Then it is followed by the challenges that we can reveal is that teachers are still in low having knowledge and skill about STEM since additionally they are in the low motivation to use it during it is getting involve with the modern technology in teaching inside.

To recommend the readers that as an English teacher especially teaching at high schools, we need to elevate and upgrade our skill in the usage of technology and be aware with the current teaching approach in order to be able to get in the students' need in the current era. Even though I myself haven't STEM in my English classroom at university but I do believe that it is a kind of a good model in integrating those current technologies within the science, mathematics and language in once time. Like [5] states that Integrating science, technology, engineering and mathematics remains a complex challenge that calls for "a new generation of STEM experts"

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