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Grade 9 Students' Perception of Career Oriented Classroom Instruction (COCI) and its Effect on their Interest in Pursuing STEM Careers

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Abstract
The field of Science, Technology, Engineering, and Mathematics (STEM) has been perceived as one of the significant fields for a nation's progress. However, there is an evident decline in the interest of students in pursuing STEM careers. This study was conducted to explore the students' perception of the use of career-based scenarios and career-related activities in a Career-Oriented Classroom Instruction (COCI) and its effects on the students' interest in pursuing STEM. A single intact group of grade 9 students was selected to undergo an intervention using the COCI. A standardized SERI questionnaire was employed to gather their perception of its use. While another validated questionnaire, the CIQ, was used as a pretest and posttest to test the effect of the intervention. The descriptive results of students' perceptions revealed that they generally agreed that the scenarios used in the learning episodes were interesting, valuable, and meaningful to them. Further, the results of the t-test conducted uncovered a significant difference between the pre-test and post-test of the respondents with regard to their career interests. Lastly, it was found that there is a statistically significant low correlation between the perception of the students on COCI and their interest in pursuing STEM careers.

Keywords: STEM, career-based scenarios, career-related activities, career interest

INTRODUCTION

STEM, an acronym for Science, Technology, Engineering, and Mathematics, holds significant value in a nation's progress. Researchers have reported that the field of STEM is unequivocally important for a nation to be competitive in the ever-changing and growing demands of the global economy (Sahin et al., 2017). This importance is even recognized by different educators, policymakers, and business organizations (English, 2016). This was further emphasized in the 2013 report of the Organization for Economic Cooperation and Development (OECD), which stated that the economies of developed countries would need a scientifically literate population. By integrating STEM education into the learning process, individuals are equipped with essential literacy in science, technology, and mathematics. This knowledge benefits not only the learners themselves but also contributes to the advancement of the entire nation. In essence, STEM education shapes individuals to become proficient in the domains of Science, Technology, Engineering, and Mathematics, enabling them to make valuable contributions to society.

However, the apparent importance of STEM in the development of a nation and the world as a whole seems to be taken for granted by students both in secondary and tertiary education, as evidenced by the declining interest of students in this field and related career (OECD, 2018). Sass (2015) reported that colleges in the United States do not produce adequate graduates of STEM-related courses. In Europe, the share of students graduating with a STEM-related degree was estimated to be below 26% of the total population of graduates (Drymiotou et al., 2021). Here in the Philippines, Anito et al. (2019) reported that there is a shortage of STEM graduates which leads to a low number of scientists, with only 189 per million people as compared to the UNESCO recommendation of 380 per million. Rafanan et al. (2020) even cited the report of the Commission on Higher Education (CHED) stating that the completion rate for STEM programs, based on five-year data, was only 21.10%. Heaverlo et al. (2013) highlighted this persisting problem and stated that there will be a shortage of engineers due to the decreasing or stagnant number of students enrolling in STEM-related programs and degrees. The OECD (2019) further emphasized that the low number of enrolees or graduates of STEM courses would not satisfy the need of a nation for STEM-related professionals.

Similar observations can be noted from Pasig City Science High School (PCSHS), a premier science-oriented public secondary school in the City of Pasig. Despite having a science and mathematics-enriched curriculum, researchers have observed that a large number of its students in the Senior High School (SHS) are not interested in pursuing a STEM career. In the study of Lucero et al. (2022), it was seen that a large number of PCSHS members are interested in careers other than those related to STEM. While it is expected for a science high school to promote STEM among its students, the contrary of choosing other careers has been the apparent track of some of the students in this secondary school.

Due to this observed decline in students entering STEM careers, researchers, policymakers, and educators have been investigating and promoting various methods of addressing the problem. Results of different studies revealed that this decline can be traced to the lack of interest of students in STEM. Blotnicky et al. (2018) explained that the students' career interest and their preferred activities in the future definitely affect their intention of choosing STEM as their future career. Potvin and Hasne (2014) specifically identified that interest in science is very critical for students to enter science-related careers. In addition to interest in science, exposure of the students to mathematics and science courses can be a strong predictor of the likelihood of the students choosing a STEM career over other careers (Wang, 2013). Clearly, based on these studies, interest plays a big role in developing STEM inclination among students. Thus, this current study delves into promoting science interest in students and whether this could lead them to enroll in STEM and gain a STEM career in the future.

Such interventions have been the focus of many researchers across the world and tried to raise the number of students who would enter a STEM-related course. However, no appropriate intervention has been applied in the context of PCSHS to effect change in the number of students who would enter the STEM field. This action research will try to address this gap. This study would explore the possible effects of exposing the students to career-oriented classroom instruction, which will focus on the use of STEM-related activities and scenarios during their class discussions to stimulate their interest in science, which can have an impact on their interest in STEM careers. This study aimed to test a teaching strategy that will contribute to the body of knowledge with the intention of increasing the number of students choosing and pursuing careers aligned with STEM.

This study is grounded on the Social Cognitive Career Theory (SCCT), which was developed by Robert W. Lent, Steven D. Brown, and Gail Hackett in 1994. This theory was based on Albert Bandura's general social cognitive theory, which was a very influential theory of cognitive and motivational processes that has been extended to the study of academic performance, health behavior, and organizational development. According to Lent et al. (2000), the SCCT is a new effort to understand the processes where individuals develop interest and are able to make choices with the goal of achieving success in their education. Wang (2013) stated that in this theory, how an individual forms his career aspirations and goals setting are explained. Furthermore, Foley and Lytle (2015) highlighted that this theory was developed to emphasize the role of background variables, self-efficacy, and outcome expectations in the development of interest in a certain vocation, choosing a certain career, and how a person performs his work in the future. This theory was extended to both work and educational satisfaction. Three interrelated aspects of career development were explained by this theory, namely: (1) how basic academic and career interests develop, (2) how educational and career choices are made, and (3) how academic and career success is obtained. A variety of concepts, like interests, abilities, environmental factors, and values, that have been found to affect career development were also incorporated into this theory.

Among the three aspects explained by this theory, the study looked at the SCCT's interest model and the SCCT's choice model. In the interest model, an individual's self-efficacy and outcome expectations may result in interest in career-relevant activities. An individual is exposed to various activities in school, at home, and in their community. Through continued activity exposure, Lent et al. (2002) argued that people refine their skills, develop personal performance standards, form a sense of their efficacy in particular tasks, and acquire certain expectations about the outcomes of the activity. Because of this, the individual develops an interest in an activity, and as he does, he is likely to develop goals for sustaining or increasing their involvement in it. In other words, an individual is more likely to form an enduring interest in an activity when they view themselves as competent at performing it and when they expect the activity to produce valuable outcomes (Lent et al., 2002). The SCCT's choice model is a model of the career choice process that builds on the interest model. According to this model, career-related interests foster educational and occupational choice goals like the intention to pursue a particular career path. In this model, SCCT suggests that interest will be a potent predictor of the types of choices people make under supportive environmental conditions (Lent et al., 2002).

Framed by the aforementioned theory, this study exposed learners to different career-related activities and career-based scenarios as learning spaces for understanding some of the mathematics and science concepts discussed in the classroom. This approach was tested to explore learners' perceptions and its correlations in the development of an interest in taking STEM.

LITERATURES

Career-based scenarios and career-related activities. Drymiotou et al. (2021) defined career-based scenarios in their study as stories related to socio-scientific issues, like climate change, deforestation, and flooding, which will create a need for a STEM professional's expertise. Vennix et al. (2017), on the other hand, defined career-related activities as the activities that inform students of the nature of the STEM career. They further coined this as outreach activities extended by universities and STEM experts with the goal of increasing the interest of the students in pursuing STEM.

The study by Drymiotou et al. (2021) revealed that career-based scenarios can generate the interest of students in STEM-related real-life situations. This further resulted in an increased awareness of STEM careers. The students had a good grasp of the concepts being discussed inside the classroom, as well as the scenarios used in the intervention. They further claimed that the use of this intervention would be better if it was started with younger students because this age group is still developing their self-concept. This finding is related to the results of Maltese and Tai (2010), which stated that students who are engaged in extra-curricular activities in the early years of high school promote their interest in STEM and encourage them to choose the STEM profession. Career-based scenarios also raised the understanding of STEM careers by promoting the active engagement of the students with experts in the STEM field and establishing clear connections between classroom discussion and genuine workplace environments (Drymiotou et al., 2021).

Related to the findings in scenarios, the use of career-related activities promotes the interest of the students in STEM careers (Vennix et al., 2017). McGee-Brown et al. (2003) had similar findings where after-school activities and programs have helped the students to better understand scientific concepts, processes, and procedures. A student's interest in a career is also influenced by its perceived benefits like income, prestige, and self-satisfaction (Nugent et al., 2015). These benefits are also discussed in career-related activities. That is why Vennix et al. (2017) recommend integrating these activities into the curriculum of secondary education.

Interest in STEM. Interest is defined as "the psychological state of a person while engaging with some types of content and also to the cognitive and affective motivational predisposition to reengage with that context over time" (Renninger & Hidi, 2016). According to Cheung (2017), interest is a unique —psychological state that occurs during interactions between persons and their objects of interest. A similar view is given by the educational theory of interest known as the person-object theory of interest. According to this theory, "interests evolve out of manifold relationships between persons and objects in social and institutional settings. Interest represents a specific and distinguished relationship between a person and an object. An object could be referred to as a concrete thing, a topic, a subject matter, or just as an abstract idea" (Renninger & Hidi, 2016).

The key features of interest include increased attention, concentration, and affection. Interest is also responsible for persons' re-engagement with specific content such as objects, events, and ideas. As a matter of fact, when a student is interested in a certain subject, he will be engaged in it and therefore focus his attention and concentration. In mathematics subjects, for example, Frenzel, Goetz, Pekrun & Watt (2013) stated that interest in math includes liking math problems, enjoying working on math tasks, and curiosity about solutions. He further added that students become more involved in their assignments, putting effort into their studies and engaging in deeper levels of thinking when they are interested in the subject. This interest then translates to their other activities beyond their school setting. According to experts, students will most likely get involved in math and science-related after-school activities when their engagement in science and math inside the classroom is high (Hayden, Ouyang, Olszewski & Bielefendt, 2013). This means that their interest influences their life outside the school and even affects their future career inclination.

While interest pushes students to strive harder, lack thereof can bring negative effects on an individual. When the grades and interest of students decline, students become undecided/unsure or insecure about their strengths and abilities, especially in math, and then a loss of desire/interest or disposition toward math and college enrollment (or a career) in a math-related field takes place (Ebert, as cited in Gandhi-Lee et al., 2015). While lack of interest in science and mathematics has been on the educational and political agenda for a long time for various reasons, there is still a great need to address issues and concerns regarding this, such as the need for a scientifically literate public; the need for employees with a STEM background; and the need of science itself to gain public support. (Savelsbergh et al., 2016).

This interest in mathematics and science can lead the students to choose the STEM field. This is due to the fact that STEM is a field that is highly grounded on mathematics concepts or subjects as well as science and technology. In the study of Wang (2013), he found that choosing a STEM major is greatly influenced by the interest of the students in science and mathematics. He further elaborated that the achievement of the students in their mathematics subjects, together with their exposure in both math and science activities, have a big impact on their decision to pursue a STEM career in their higher education. Further, the key findings of the study of Hasni and Potvi (2015) state that the decision of the students to continue STEM studies is influenced by their interest and self-efficacy in math and science. Sahin et al. (2017) supported these findings and added that students who were more interested and confident in math and science would likely choose STEM majors in their college education. This interest of the students plays a major role and takes precedence in the career choice of these students (Dou, 2017). There are students who show agreement for choosing STEM careers due to their intrinsic interest (Sahin et al., 2017).

Educational institutions should help students to choose an educational area where students can better accommodate themselves for future careers (Bishop, 2015). These institutions are under pressure to teach students to be adept in science and math and to encourage them to consider these subjects as career choices. Because students spend so much time at school interacting with their teachers, it is important to emphasize that what happens inside schools has a lasting effect on the development of learning (Gablinske, 2014). Brain research provides information about the acquisition of material and how it can be linked to motivation.

Several researchers have suggested a variety of strategies to increase students' interest in STEM areas. Hasni and Potvi (2015) suggested ways how to promote the development of interest in science and math among the students. According to them, schools should greatly affirm the importance of science and technology right from the start of primary schooling. They also added that teachers' use of pedagogies that allow learners to link what they learn in the classroom to their daily situations is equally important. Lastly, they stressed that cultural activities related to science and technology and the positive development of the student's confidence must be promoted and cultivated.

The literature review reveals that there are substantial studies related to interest and increasing interest in science and math, which would then lead to interest in pursuing STEM careers. However, very little research has been conducted on the use of career-based scenarios and career-related activities to increase interest in STEM careers. Here in the Philippines, career-based scenarios are still not used in teaching math or science. However, there are career-related activities being done as part of the Guidance program. This research intends to address this gap and lay a good foundation for the possible effects of career-oriented classroom instruction in increasing the interest of students in pursuing STEM careers. Specifically, this study sought to answer the following research questions:

1. What is the perception of Grade 9 students on Career-Oriented Classroom Instruction (COCI) based on relevance and interest?
2. What is the effect of career-oriented classroom instruction on the interest of Grade 9 students in pursuing STEM careers?
3. Is there a correlation between the perception of Grade 9 students on career-oriented classroom instruction and their interest in pursuing STEM careers?

METHODOLOGY

Participants. This study involved Grade 9 students at Pasig City Science High School. This grade level has an average age of 14-16 years old. The career guidance program of the school starts at this level, where the students start to think about the strand they want to pursue in Senior High School. This is an initiative of the school as mandated by RA 11206, otherwise known as the Secondary Career Guidance and Counseling Act of 2019.

Specifically, the researchers selected an intact group to be the sample of this study. One section in PCSHS has an average of 30 students composed of males and females, and so with this selected intact group.

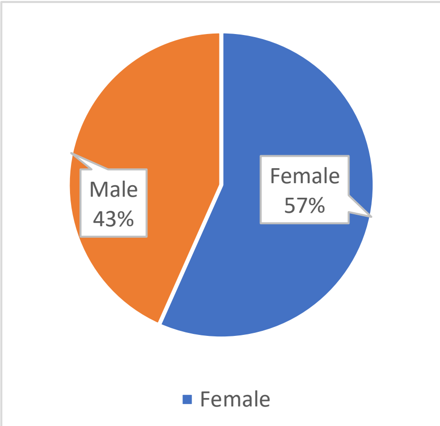

Figure 1
Participants' Distribution by Gender

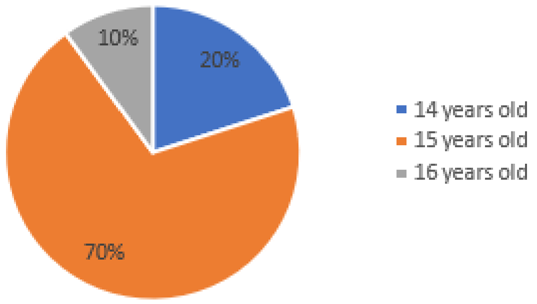

Figure 2
Participants' Distribution by Age

Figures 1 and 2 show the distribution of the participants based on gender and age, respectively. It clearly shows that most of the participants are female and that the 15-year-old students dominate the class in terms of their number.

Instrumentations. This investigation was quasi-experimental in nature, where the researchers utilized the available intact group without the random assignment of the participants. Particularly, this employed the single-subject design, where the researchers studied the behavior of a single group, and the group became its own control in the experiment (Creswell, 2012). In carrying out this design, the researchers administered the adopted Career Interest Questionnaire (CIQ), which was developed and tested by Knezek and Christensen (2013), to gather baseline data on the career interest of the respondents. The CIQ is a tool that consists of 13 items divided into three scales. The scales assess the following concepts: perception of a supportive environment for pursuing a career in science, interest in pursuing educational opportunities related to a career in science, and perceived significance of a career in science. The questionnaire utilizes a Likert-type scale, with respondents indicating their level of agreement on a scale of 1 (strongly disagree) to 5 (strongly agree). Cronbach's Alpha was reported by Knezek and Christensen (2013) to be at .94, which makes the reliability of this instrument to be excellent. Data from this current investigation was also used to generate a reliability index using Cronbach's Alpha of .92. Prior permission to use this instrument was sought by the researchers, and written consent from the developers was acquired. This questionnaire still underwent content and face validation by experts to establish its useability for Filipino learners.

The treatment for this group consisted of six classroom discussion sessions that applied career-oriented classroom instruction. The six sessions were composed of two sessions each for Physics, Chemistry, and Biology. The teacher used career-based scenarios in any part of the lesson as the major strategy in delivering the lesson. For this purpose, lesson plans highlighting those scenarios were developed by the researchers. These lesson plans were checked and validated by the Head Teacher, Master Teacher, and Assistant School Principal to ensure that the scenarios were appropriate for the attainment of the lesson objectives. As part of career-related activities, the teacher related the lesson to how STEM experts encounter such scenarios in their own field. On top of the validation of the lesson plans that were used, various science teachers and master teachers were invited to observe the lesson delivery. This is to ensure that the planned scenarios were utilized properly during the lesson and that their use is evident in the eyes of other teachers as well as the students.

After the six classroom instruction sessions, the learners had two sessions in which they were able to mingle with experts in the STEM field. This included a chemist, a medical doctor, a medical technologist, and an engineer. The experts were given time to share their personal experiences and insights as STEM experts. After this, the learners raised their questions and communicated with the experts. Due to time constraints, this activity was done via online platforms.

At the end of the treatment, the researchers administered another adopted instrument, which was developed and tested by Kang et al. (2018). The Scenario Evaluation with Relevance and Interest (SERI) is a tool to measure students' perception of scenarios that are used in context-based learning (Kang et al., 2018). This tool is composed of Likert scale items that measure the constructs relevance and interest. The reported reliability index using Cronbach's Alpha was greater than .70 (Kang et al., 2018). For this current study, the researchers were able to compute Cronbach's Alpha to be at .88 for items measuring the construct relevance, and similar results were obtained for items that measure the construct of interest. Subsequent permission to use this tool was also acquired from the developers. This tool also underwent content and face validation and was administered via MS Forms to the students. Data from this tool were used to answer the first research question.

The CIQ was re-administered as a post-test to the respondents. Their scores in this post-test were compared to their pre-test to determine the effect of career-oriented classroom instruction on their interest in pursuing STEM careers. Further, both the SERI and CIQ had additional open-ended questions to gather qualitative data from the respondents. This was to gather a deeper understanding of the perception of the students on COCI and their career interests. These questions asked about how they envision their future career and what they like best or least in the use of scenarios in teaching science. The themes that emerged from their responses were used to support or validate the data gathered from the questionnaires. Overall, the questionnaires, including these open-ended questions, underwent content and face validation before administration.

Lastly, necessary permits were secured from the School Principal for the purpose of this research. Likewise, participants' consent to take part in this study was prioritized.

Data Analysis. Data from SERI was examined using descriptive statistics to establish the students' perception of the career-based scenarios and career-related activities used. Meanwhile, data from CIQ both underwent descriptive statistics and t-tests to answer the second research question. Lastly, Spearman's rank correlation was employed to determine if there is a correlation between the perception of the students of COCI and their interest in pursuing STEM careers.

Table 1 below shows the verbal interpretations used in this study to examine the results of the two Likert-scale questionnaires, namely SERI and CIQ, respectively.

Table 1
Verbal Interpretations for Likert-scale Questionnaires

For SERI Tool		For CIQ tool	
Range	Interpretation	Range	Interpretation
3.50-4.00	Totally Agree	4.50-5.00	Strongly Agree
2.50-3.49	Agree	3.50-4.49	Agree
1.50-2.49	Disagree	2.50-3.49	Undecided
1.00-1.49	Totally Disagree	1.50-2.49	Disagree
		1.00-1.49	Strongly Disagree

All statistical examinations were run using the JASP 0.17.2 software and R studio, while qualitative data from open-ended questions were subjected to thematic analysis.

Ethical Considerations. The three overarching Belmont principles of beneficence, respect for human dignity, and justice were all upheld in this investigation.

Regarding beneficence, the researchers guaranteed that participants experienced no discomfort or injury throughout the investigation. The participants were also fully informed about the research, including its protocol, dangers, and other pertinent details. The participants were also informed before the investigation about the possible impact of this study on students like them as they interact with STEM experts and consequently develop an interest in STEM careers. Finally, research subjects were protected from exploitation, and no conflict of interest was involved in the whole conduct of this research.

On top of the intention of providing a positive contribution, this study has observed and followed the principle of non-maleficence or the principle of doing no harm to anything or anyone. It was openly expressed that there is no intention to cause harm to the participants, the school, the teachers, STEM experts, and the whole grade-nine students. After the intervention, the researchers made sure that the students' experience under COCI remained positive and that no confusion had sprung up from this investigation.

Concerning human dignity, the researchers first secured the participants' consent to participate in the study. They informed the participants that they had the freedom to decline to engage in the study, to ask questions about its purpose, to withhold information, and to ask questions about the study itself. Further, while PCSHS promotes STEM careers since it is a science high school, the participants were still oriented that this study respects their future decisions and did not intend to dictate their future careers. Lastly, participants' information was kept confidential throughout the study, and the research was never intrusive in one way or another.

Adhering to the principle of justice, the researchers emphasized that participants could receive fair treatment regardless of their beliefs, career choices, and economic status. Also, while it is expected that the investigation would benefit the participants, other grade-nine students who were not included in the sample were also given the chance to experience direct interaction with STEM experts outside this research. The researchers pushed for the inclusion of this activity in the school's career guidance program, which benefitted the ninth graders.

RESULTS

Perception of COCI Based on Relevance. The respondents were asked to answer the SERI after the treatment and yielded the following results. Table 2 shows their perception of the scenarios used in teaching science concepts based on their relevance to them.

It can be gleaned from the result in Table 2 that the students find the scenarios that were used in COCI to be relevant to them, as shown by their overall mean score with a verbal interpretation of Agree. Specifically, the respondents totally agree that the scenarios in COCI enable them to gain new knowledge in science and that this can be useful to them in the future. They further believed that they could put the knowledge they gained from the scenarios used in COCI into practice and that it would be useful in learning school subjects, particularly science.

Table 2
Perception of the Students on COCI Based on Relevance

Item	Mean	SD	Interpretation
1. The scenario used enables me to gain new knowledge about the scenario's topic.	3.667	0.479	Totally Agree
2. The knowledge I gain from the scenarios may be useful in the future.	3.667	0.479	Totally Agree
3. I can put knowledge gained from the scenario into practice, to solve problems.	3.500	0.509	Totally Agree
4. I find the scenario topics important for me personally.	3.133	0.681	Agree
5. I find the scenario topics important to my family.	3.000	0.695	Agree
6. I find the scenario topics important for learning school subjects	3.500	0.572	Totally Agree
7. I find the scenario topics important for appreciating the work of our local community (city or country).	3.467	0.629	Agree
8. I find the scenario topics important for the whole world.	3.700	0.466	Totally Agree
9. The scenario presents a scientific problem, which is socially relevant.	3.433	0.504	Agree
10. From these scenarios, I am able to gain new knowledge about possible careers.	3.600	0.498	Totally Agree
11. The scenarios enable me to understand the responsibilities of the persons in the career position indicated.	3.567	0.504	Totally Agree
12. The scenarios enable me to understand the skills that are necessary in this profession.	3.367	0.490	Agree
13. I feel my future career may be connected with the topics covered in the scenarios.	3.033	0.718	Agree
14. I think my future studies at the university level may be connected to the topic covered in the scenario.	3.167	0.699	Agree
15. I predict I will need to perform skills, described in the scenario, in my future career.	3.167	0.699	Agree
16. I predict I need to perform science-related skills, described in the scenarios, in my future career.	3.067	0.640	Agree
17. I predict I need to perform science-related skills, described in the scenarios, in my future career.	3.033	0.718	Agree
Overall Mean	3.357	0.351	Agree

The results also showed that the career-based scenarios in COCI have affected their career interest. The respondents totally agree that because of the scenarios used, they were able to gain new knowledge about their possible careers and the responsibilities of those experts in the careers used in COCI. They also agreed to the items in the questionnaire that indicate their possible careers related to the scenarios used in this study. This further implies that they can see themselves performing those skills of STEM experts and other science-related skills necessary in their future careers.

These results are in consonance with the study of Drymiotou et al. (2021), which stressed that career-based scenarios can give the students a better understanding of the science concepts discussed in the classroom where the scenarios were used in the teaching strategy. Furthermore, their study revealed that the use of career-based scenarios can lead to an increased awareness among the students of the different STEM-related careers.

Perception of COCI based on Interest. The second part of the SERI questionnaire was intended to acquire the perception of the respondents based on their interests. The results are presented in Table 3, where it can be clearly seen that the learners agree that the scenarios used in COCI are interesting to them. They also find the scenarios used in COCI to be meaningful and valuable to them. Drymiotou et al. (2021) argued that this interest in STEM-related real-life situations can be promoted by the use of career-based scenarios. This result can be attributed to the engagement of the students in activities related to STEM careers that are used in COCI. This finding is supported by Maltese and Tai (2010) and Heaverlo (2013) where it was emphasized that student engagement in various activities related to STEM can promote interest among the learners and eventually choose to pursue a STEM career.

Table 3
Perception of the Students on COCI based on Interest

Item	Mean	SD	Interpretation
1. I find the scenarios interesting to me.	3.267	0.640	Agree
2. I find the information in the scenarios valuable to me.	3.200	0.610	Agree
3. I liked the scenarios.	3.300	0.596	Agree
4. The scenarios make me want to learn more about the topic.	3.033	0.765	Agree
Overall Mean	3.200	0.562	Agree

To better understand the perception of the students about the use of COCI, open-ended questions were included in the questionnaire. The responses of the learners were examined thematically by two researchers. These researchers then agreed on the prevalent themes that emerged.

When asked about what they liked best or least on the use of COCI, the responses were mostly positive, and four themes have surfaced from the qualitative data gathered. These themes are interesting topic, acting like a STEM expert, interactive activities, and meet the expert. Majority of the students liked the use of COCI because the topics discussed have become interesting to them due to the scenarios used. Further, they enjoyed the lessons with the use of COCI specially when they were asked to act like how a STEM expert does in the field during the class activities. These two themes had 40% each of the responses while the remaining data revealed that the respondents liked the use of COCI because of the interactive activities in STEM related fields as well as the experts they met during the intervention.

Clearly seen in these results, the quantitative data jive with the qualitative in that the students liked the use of COCI in their science classes. This can be attributed to the fact that with the use of COCI, teachers can affirm the importance of science and they can provide a link to what learners learn inside the classroom to what they can actually experience in their day to day lives. In this way, teachers promote interest in science and STEM careers at the same time (Hasni & Potvi, 2015).

Effect of COCI on the Interest of Grade 9 Students in Pursuing STEM Careers. This research also looked at the effect of COCI on the interest of the respondents in pursuing a STEM career. Table 4 below reveals the results of their answers to the Career Interest Questionnaire.

The first part of the questionnaire measured the construct and perception of a supportive environment for pursuing a career in science. The table shows that the respondents agree that they have a supportive environment that would push them to pursue STEM-related careers. Likewise, the respondents agree that they have an interest in pursuing educational opportunities that are related to science careers, as shown with the mean in the second part of the table. Lastly, when it comes to the construct perceived significance of a career in science, respondents' mean fell within the verbal interpretation of Agree. Overall, results showed that the students indeed have an evident interest in careers that are related to science, technology, engineering, and mathematics (M=3.967; SD=0.567).

Table 4
STEM Career Interest

Item	Mean	SD	Interpretation
1. I would like to have a career in science.	3.633	1.066	Agree
2. My family is interested in the science courses I take.	4.233	0.626	Agree
3. I would enjoy a career in science.	3.800	0.805	Agree
4. My family has encouraged me to study science.	3.967	0.850	Agree
Mean	3.908	0.607	Agree
5. I will make it into a good college and major in an area needed for a career in science.	3.967	0.890	Agree
6. I will graduate with a college degree in a major area needed for a career in science.	3.700	0.952	Agree
7. I will have a successful professional career and make substantial scientific contributions.	3.733	0.907	Agree
8. I will get a job in a science-related area.	3.700	0.988	Agree
9. Some day when I tell others about my career, they will respect me for doing scientific work.	3.767	0.971	Agree
Mean	3.773	0.835	Agree
10. A career in science would enable me to work with other in meaningful ways.	4.133	0.819	Agree
11. Scientists make a meaningful difference in the world.	4.600	0.498	Strongly Agree
12. Having a career in science would be challenging.	4.367	0.490	Agree
13. I would like to work with people who make discoveries in science.	3.967	0.669	Agree
Mean	4.333	0.396	Agree
OVERALL MEAN	3.967	0.567	Agree

*This item was reverse scaled.

To address the second research question, the gathered mean was statistically compared to the pretest mean. Ordinal data from the CIQ was converted into continuous by getting the overall score from the Likert-scale questionnaire. A Shapiro-Wilk test was conducted to establish the normality of the data. Results have validated that the data was normally distributed. Hence, the researchers proceeded with the paired t-test. Table 5 depicts the results of the test done on the data.

Table 5
Comparison of the pretest and posttest data of the CIQ

Measure 1	Measure 2	n1	n2	t stat	df	p	Cohen's d	magnitude
Pre-test	Post-test	30	30	3.51	29	0.001	0.93	large

Results of the paired t-test revealed that there is a significant difference, $p < 0.01$, between the mean of the pretest (M = 45.2; SD = 6.95) and the mean of the posttest (M = 51.8; SD = 7.31) with a large effect size (d = 0.93). Since the posttest mean is greater than the pretest, it can be implied that the use of COCI in science classrooms has affected positively the interest of the students in careers in science. This is consistent with previous studies on scenario-based instruction in saying that career-related scenarios and activities promote interest among students to choose STEM for their future careers (Drymiotou et al., 2021; Vennix et al., 2017; McGee-Brown et al., 2003).

Qualitative data was also collected in order to gain an in-depth analysis of the problem at hand. The respondents were asked about the factors or experiences they had that could have affected their career interests. A thematic analysis was conducted on their responses, and three main categories or themes were revealed. The themes that emerged are family and friends, their interests and passion, and the interaction with the experts in a particular field.

The participants answered that their mom or anyone in their family influences their career choice. It is either their family member who encourages them to pursue that career or a family member is an expert in that field. Further, the respondents also identified a supportive circle of friends. This theme encompasses responses that stated that their friends encouraged them to choose a particular career or that they would go into STEM or any other field.

Another emerging theme was their interest and passion. It was clearly stated in their responses that they would choose a STEM career because they are good and interested in science or math. Other responses did not state STEM in particular but emphasized that they will choose a particular career because that is what interests them.

Lastly, the responses pointed out that experts in the field with whom they interacted or surrounded them have influenced their choices for their future careers. In particular, the respondents added that when they got an idea of what the expert usually does in that field, their salary, and the expenses they had during their college education leading to that career, their interest in that career increased. These factors that were identified can affect the interest of the students towards their possible career inclination. Renninger and Hidi (2016) stressed that interest can evolve from relationships between persons and objects in both institutional and social settings. Once interest is stimulated, it can influence their decision to enter a STEM field or other fields for that matter (Hasni & Potvi, 2015). This was further supported by Sahin et al. (2017) in stating that students who showed agreement for choosing STEM careers are due to their intrinsic interest. Therefore, this interest takes precedence in the choice of students for their future careers (Dou, 2017).

Correlation between Student Perception of COCI and Their Career Interest. To further investigate this current study, the researchers looked at the correlation between the students' perception of career-based scenarios and activities in COCI and their interest in choosing a STEM career. Since data from the questionnaires are ordinal in nature, Spearman's rank correlation coefficient was computed to assess the linear relationship between these variables. Results showed that there is a statistically significant low positive correlation, $r\ (28) = .38$, $p = 0.038$, between their perception of COCI and their career interest.

This finding shows that, as some of the respondents indicate their positive perception of the use of COCI, the same is true of their answers in the Likert-scale questionnaire on their career interests. It is important to note, though, that their interest in science careers is not caused by their perception of COCI. As the data from the qualitative questions suggest, their interest in careers in STEM may be influenced by their family and friends. However, this current study has emphasized that the use of COCI can promote interest among students and eventually lead to their STEM career choices (Drymiotou et al., 2021).

DISCUSSION

This current investigation has focused on the perception of grade 9 students on the use of career-based scenarios in a teaching strategy, which was introduced as Career-Oriented Classroom Instruction, and its effects on their interest in pursuing a STEM career. Based on the findings of this study, it can be stated that the use of career-based scenarios and activities in COCI can promote awareness and interest in STEM careers among students. This is attributed to relevant and interesting real-life scenarios that were used in COCI wherein the learners can relate and act as one of the STEM experts in the scenarios used. Moreover, interest is promoted by using COCI because the teachers can provide a link between what learners learn inside the classroom and what they can actually experience in their day-to-day lives, affirming the importance of science in their daily lives.

This study further concludes that COCI as a teaching strategy can stir interest and awareness among students about the different STEM careers. This method of teaching allows the learners to see what a STEM expert does in the field and interact with those experts in the field of science. Hence, they are provided with an avenue to become a STEM expert in the future.

Lastly, the researchers conclude that COCI can be a very promising method of instruction that will be available for all science teachers as it promotes awareness and interest in STEM careers among secondary school learners.

Hence, it is duly recommended, from the findings of this research, that teachers incorporate career-based scenarios and activities in their classes. Moreover, teachers should often provide a link between their lessons and what STEM experts do in the field. Their students must see an actual application of their lessons to what the experts in various STEM fields are doing. In this way, they will have an idea and interest in choosing STEM as their future careers.

While this study focused on the impact of using COCI on the students' interest in choosing STEM, future investigations can be conducted on its impact on academic achievement, particularly in Math and Science. Researchers can also look at various factors that might moderate or mediate the impact of COCI on both academic achievement and interest in STEM careers.

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