

Enrich Competencies for Sustainability through Radio Drama Competitions- A Multiyear Cross-sectional Study in Hong Kong

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Abstract

This study investigates the use of radio drama competitions to enhance competencies for sustainability among students. It focuses on how radio drama competitions can provide students with opportunities to develop collaboration, critical thinking, and problem-solving competencies within the sustainable development framework proposed by UNESCO. The study utilized a mixed-method approach, including online surveys and in-person interviews, to evaluate the effects of Hong Kong students' participation in radio drama competitions on the development of their competencies for sustainability over a period of four years. Both the quantitative and qualitative data suggested radio drama competitions had a positive impact on enriching students' collaboration, critical thinking and problem-solving competencies. Students and teachers believe these critical competencies for sustainability can be acquired and enriched from the radio drama competition. These competencies help develop global citizens who can nurture more sustainable societies (UNESCO, 2017).

This research also aims to contribute to the existing body of knowledge by incorporating insights on how radio drama competitions can empower primary and secondary school students from Hong Kong to develop these sustainable competencies through experience and reflection. The radio drama competition offers a platform for students to explore complex sustainability issues, express their creativity, collaborate with other students, as well as engage with a broader audience. In addition, this study provides suggestions on how radio drama competitions can be used as an educational tool for sustainability, integrated into primary or secondary schools' curriculum, nurture students' transferrable skills and achieve the goals of Education for Sustainable Development (ESD) at very young age.

Keywords: education for sustainable development, ESD, sustainability competencies, drama education, radio drama, collaboration ability, critical thinking, integrated problem-solving competency

1. Introduction

The United Nations Educational, Scientific and Cultural Organization (UNESCO) claims the acquisition of competencies for sustainability has become a crucial aspect of education in an increasingly interconnected and complex world (UNESCO, 2017). In addition, UNESCO is leading efforts to promote Education for Sustainable Development (ESD), coordinate the Education 2030 Framework for Action and achieve the 17 Sustainable Development Goals (SDGs). One of these goals is to provide all with inclusive and equitable education, as well as support lifelong learning opportunities (UN, 2015). It is also important to define relevant learning resources and pedagogies that can effectively support ESD (UNESCO, 2017).

In particular, UNESCO emphasizes the significance of fostering collaboration, critical thinking, and problem-solving competencies among students to address the challenges posed by sustainable development (UNESCO, 2017). This paper explores how radio drama competitions can be used to equip students with the necessary experience to develop these competencies within the framework set by UNESCO.

1.1 Background and Rationale

Sustainability education aims to equip individuals with the knowledge, skills, and attitudes needed to contribute to a

sustainable future (UNESCO, 2017). UNESCO emphasizes the importance of integrating sustainability into educational practices. The competencies for sustainability, which include collaboration, critical thinking, and problem-solving, have been identified as essential skills for students to navigate the complexities of sustainable development. Competencies cannot be taught and have to be developed by the learners themselves. They are acquired during action, on the basis of experience and reflection. (UNESCO, 2017)

Radio drama and radio drama competitions offer unique platforms for students to engage in creative storytelling while simultaneously developing these crucial competencies (Chan & Tang, 2022; Sze, 2006). By participating in such competitions and edging in the production of radio drama, students are encouraged to collaborate with their peers (Sze, 2006), think critically about the way they perceive the world (Dima, 2021), and find innovative solutions to address the problem they faced (Cicek & Palavan, 2017), allowing them to develop their competencies for sustainability in an experience-based approach.

1.2 Objectives of this Study

The utilization of a radio drama competition to increase language learning motivation, self-confidence, and cooperation for primary and secondary school students in Hong Kong was examined in our prior work (Chan & Tang, 2022). The findings suggest that the radio drama competition had a positive impact on raising motivation, teamwork, and self-assurance in language acquisition. In this study, we wanted to focus on how radio drama competitions affect students' competencies for sustainable development.

The primary objective of this paper is to examine how radio drama competitions can effectively contribute to the acquisition of collaboration, critical thinking, and problem-solving competencies among students, as outlined by UNESCO (UNESCO, 2017). Specifically, this study aims to:

- Investigate the theoretical foundations underpinning the use of radio drama competitions as an educational tool for sustainability.
- Explore the ways in which radio drama competitions can facilitate collaboration among students.
- Evaluate how engagement in radio drama competitions can enhance critical thinking skills among participants.
- Examine the role of radio drama competitions in developing problem-solving competencies within the context of sustainability education.

2. Literature Review

The 17 Sustainable Development Goals (SDGs), which outline the obstacles of human development, form the foundation of UNESCO's 2030 Agenda (UNESCO, 2015). These 17 SDGs include the fields of social needs and environmental protection, tackling the challenges that humans are facing now and in the future. Target 4.7 of SDG 4 is focused on ESD and the sustainability knowledge and skills that educators should foster in order to develop global citizens who are change agents for more sustainable societies (UNESCO, 2017). These include, but are not limited to, embracing human rights, sustainable consumption, gender equality, and cultural diversity (Cebrián et al., 2021).

Irina Bokova, the General Director of UNESCO, stated that education plays a critical role in fostering a fresh perspective on sustainable global development and adjustments are necessary in order for education to effectively address the challenges of the twenty-first century (UNESCO, 2015). In order to achieve these goals, UNESCO proposed the concept of "Education for Sustainable Development (ESD)", which aims at empowering people to reflect on their own actions and take into account how such actions affect society and the environment (UNESCO, 2017).

2.1 Education for Sustainable Development and Competencies for Sustainability

Sustainability education encompasses a multidisciplinary approach that aims to develop individuals who are capable of addressing pressing environmental, social, and economic challenges UNESCO (2015). Sustainability education should equip learners with the competencies necessary to promote sustainable development and make informed decisions. According to UNESCO (2017), these competencies include systems thinking, anticipatory, normative, strategic, collaboration, critical thinking, self-awareness, and integrated problem-solving, and they can be categorized into cognitive, socio-emotional and behavioral domains (refer to Figure 1).

Among them, collaboration competency, critical thinking competency and problem solving-competency should be developed since very young age (Aizikovitsh-Udi & Cheng, 2015; Cicek & Palavan, 2017; Legare et. al., 2012). UNESCO (2017) proposed mainstreaming ESD into the curricula of early childhood, primary, and secondary school

students' formal education. This paper explores how radio drama competitions can help develop these three key competencies for sustainability education for primary and secondary school students in Hong Kong.

Collaboration is an essential competency for sustainability as it encourages students to work together, share ideas, and respect diverse perspectives (OECD, 2018). By engaging in collaborative activities, students learn effective communication, teamwork, and negotiation skills, which are crucial for addressing complex sustainability challenges that require collective action. With collaboration competency, students acquire the ability to understand and respect others with empathy, learn from each other and deal with conflicts in a group with empathic leadership (UNESCO, 2017).

Critical thinking is another critical competency for sustainability education. ESD aims to empower and inspire learners to become engaged participants in creating a sustainable future, fostering critical thinking and active citizenship. Pedagogical methods aligned with this objective are learner-centered, action-oriented, and transformative in nature (UNESCO, 2017). Critical thinking involves analyzing information, questioning assumptions, and evaluating evidence to develop informed perspectives (Straková & Cimermanová, 2018). The amount of information available in this information-technology era is enormous. Future generations will continue to experience this kind of information overflow; students need to actively filter the information rather than merely taking it in. It's essential to use critical thinking to make intelligent assessments and conclusions (Taimur & Sattar, 2019).

Problem-solving competencies encompass the overarching capacity to utilize diverse problem-solving frameworks when addressing intricate sustainability challenges. This involves formulating viable, inclusive, and equitable solution alternatives that advance sustainable development, while integrating the aforementioned competencies (UNESCO, 2017). Problem solving is a composite skill that calls for the use of other abilities like discretion and reasoning, self-awareness and understanding of the environment, understanding and analyzing the cause-and-effect relationships between various circumstances and events, and developing original solutions to problems. (Cicek & Palavan, 2017; Erbay, 2009:1). People who did not learn how to solve problems as children find it more difficult to deal with them as adults, which increases the likelihood that they will experience low self-esteem and miserable lives. Furthermore, the motivation to nurture pupils' problem-solving skills at a young age for the sustained development of the whole individual stems from the fact that problems get more complicated as people mature and their circumstances and surroundings change. (Üstün, Bozkurt, 2003).

2.2 Radio Drama Competitions as an Educational Tool for Sustainability

To foster the competencies for sustainable development, active learning initiatives such as SDGs collaborative real-world projects which match the needs of the learner group accordingly with their age, prior knowledge, interests and abilities with sufficient support are preferred (UNESCO, 2017). Radio dramas are audio-based narratives that combine storytelling, sound effects, and voice acting to engage listeners (Maiullo, 2018). They offer a unique medium for students to explore complex sustainability issues, express their creativity, and engage with a broader audience. The history of radio drama dates back to the 1920s, when radio was first used as a public utility. (Huwiler, 2010). As internet technology advanced, radio theater took on other forms, such as online audio play, and there are still a lot of unexplored possibilities (Dann, 2014). One possibility is the implementation of radio drama competitions for students. The radio drama competition in this study has been conducted for over 15 years. All primary and secondary school students in Hong Kong and Macao were invited to join (Chan & Tang, 2022). Participants were asked to form a group of 2-5 members and submit a radio drama script in phase 1 of the competition then the radio drama program audio file for phase 2. For students entering the final, they had a chance to perform the radio drama on stage. The participants were assessed based on the content; creativity in story, plot, and character development; narrative skills; expressiveness; use of articulation; voice projection; thoughtful use of sound effects; and teamwork and cooperation (Chan & Tang, 2022). The objective of the competition is to provide students with opportunities to enhance their language skills, develop their collaboration, critical thinking and integrated problem-solving skills.

During the process of the radio drama competition, students worked in teams to compose a script, create sound effects and perform the radio drama program on stage. Through radio drama, students had many opportunities to collaborate with their peers and develop collaborative skills (Sze, 2006; Sunchat, 2005). Students have to work together in a drama program, try to keep the drama going, encourage one another to believe, and share their interpretations and thoughts with the group (Üstündağ, 1997). Group-based co-operative project work can effectively improve students' ability in collaboration (OECD, 2018).

The competitions provided three or more themes for students to choose from to create their own radio drama program. The themes often relate to sustainability issues such as equality, environment or humanity issues. Students are asked to critically review the issue, analyze the information, and come up with solutions (Dima, 2021). As they

tackle sustainability-related topics like climate change, humanity, culture heritage, etc., students are encouraged to think critically about the complexities of the issues and propose innovative solutions within the constraints of the medium. The development of students' critical thinking abilities is affected by the traditional structural features of schools, which place students in a classroom environment shielded from outside dangers and uncertainties. However, storytelling is a powerful tool that helps students reevaluate how they relate to the outside world (Mena Araya, 2020). Students who participate in the radio drama competition have the opportunity to connect their classroom learning to real-world situations and learn to consider the social, economic, and environmental dimensions of the problems at hand and to convey these complexities effectively through storytelling (Fischer et al., 2020). Typically, drama begins with an issue that causes tension and demands an answer. It is expected of students to think about the issue, analyze the information, and come up with pertinent conclusions and answers (Dima & Tsiaras, 2020). Students can also process the fulfillment of these experiences as well as the situations they encounter in a drama program (Dewey, 1986). Radio drama competitions can therefore provide an avenue for students to develop their critical thinking and problem-solving competencies.

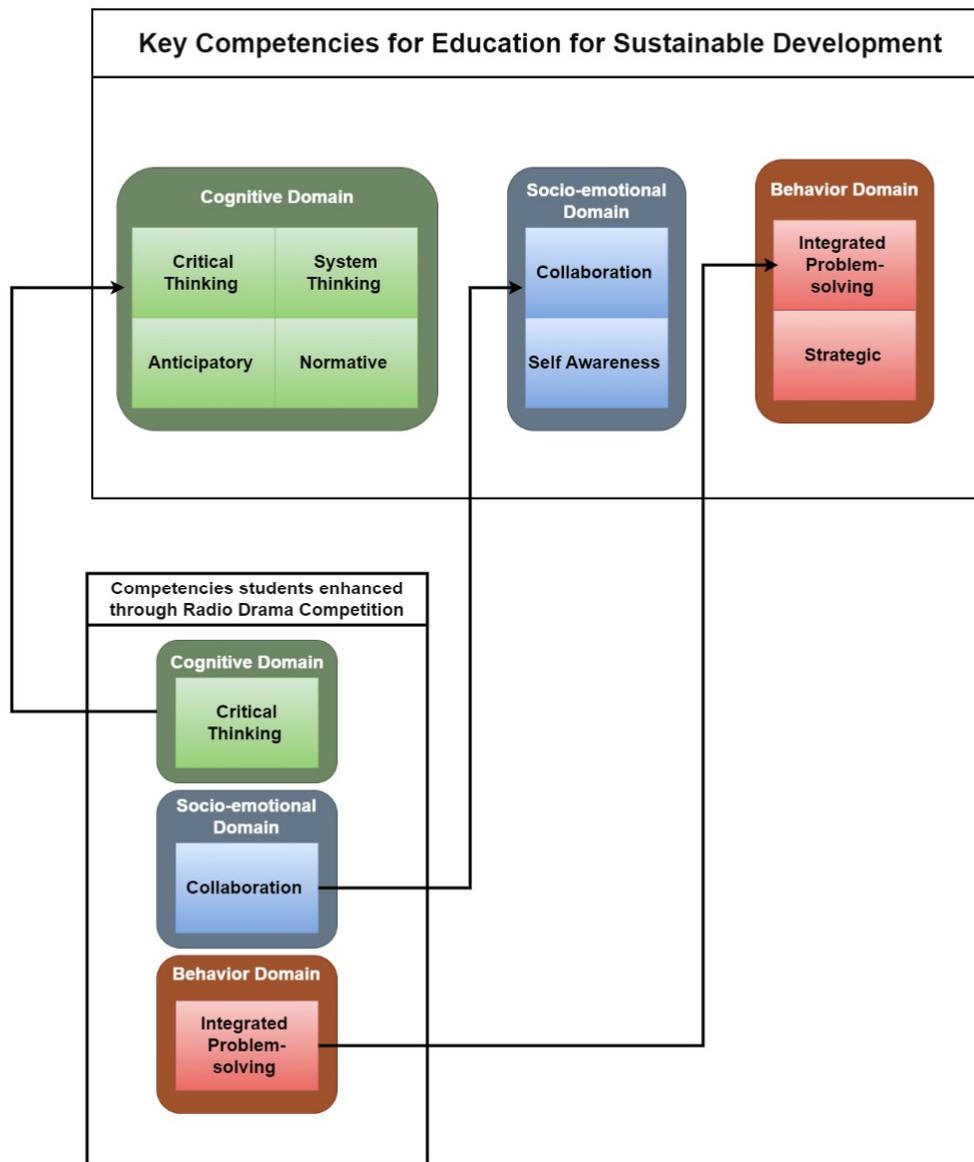


Figure 1. Theoretical and Conceptual Framework of Education for Sustainable Development and Radio Drama Competition

3. Research Questions

After the announcement of the framework of competencies for sustainability by UNESCO, many research studies have been conducted (Cebrián et al., 2021; Levesquire & Wake, 2021; Tejedor et al., 2019; Bürgener & Barth, 2018), including the review of the framework and the revision of existing teaching syllabi, to align with the desired outcomes. The majority of these studies, however, have been conducted in North America and Europe, with only a small amount of attention given to the Asian region (Olsson et al., 2019), whose educational system differs significantly from that of the west due to historical and cultural differences (Berglund et al., 2020).

While there has been an increasing emphasis on sustainability education in higher education institutions (Cebrián et al., 2021; Levesquire & Wake, 2021; Berglund et al., 2020; Tejedor et al., 2019; Bürgener & Barth, 2018), there remains a dearth of comprehensive studies focusing on primary and secondary school education. The research gap highlights the need for investigations that specifically address the application of sustainability competencies in Hong Kong and among primary and secondary school students.

To bridge this gap and contribute to the existing body of knowledge, this study will utilize radio drama competitions as a real-world setting to assess how these competitions can effectively enhance the acquisition of collaboration, critical thinking, and problem-solving competencies for sustainability education. This research study aims to provide insights into the effectiveness of radio drama competitions as an educational tool for fostering sustainability competencies in primary and secondary school students in Hong Kong. Figure 1 illustrates the theoretical and conceptual framework of this study.

Our study addresses the following research questions:

RQ1: Can participation in the radio drama competition enhance collaboration, critical thinking, and problem-solving competencies among students for sustainable development?

RQ2: How can schools incorporate radio drama competition or its components in their curriculum and pedagogy to enhance students' transferrable skills including collaboration, critical thinking and problem-solving skills?

4. The Methodology

4.1 Research Design

This study used a mixed method approach to examine how radio drama competitions foster skills for sustainability. A parallel convergent design was implemented, both qualitative and quantitative research methods were applied in our study. Online surveys were used in our quantitative research, while in-person interviews in English were used in our qualitative research. Participants in the study were teachers and students who took part in the primary and secondary school divisions in four years (2019–2020, 2020–21, 2021–22 or 2022–23) of the radio drama competitions. The radio drama competitions were open to students in all primary and secondary schools in Hong Kong.

4.2 Data Collection Procedures

The quantitative part of the study used an online survey in Google Form. This survey was sent to all participants of the radio drama competitions after the competition. Students could participate in the survey voluntarily. The data collection method used 5-point Likert scale items to measure participants' perception on their collaboration and teamwork improvements as a result of the competition. The survey's personal data was handled in accordance with the provisions of the Personal Data (Privacy) Ordinance (PDPO) in Hong Kong.

Item: The radio drama competition is a useful tool to improve collaboration and teamwork. (1=strongly disagree to 5=strongly agree)

The qualitative part of the study involved in-person interviews with students and teachers who took part in the radio drama competition. Interview requests were sent after the competition, participants responded to our request on a voluntary basis. We wanted to learn from the participants and their teachers if the competition helped enhance their collaboration, critical thinking and problem-solving competencies. The interviewees also offered suggestions on how we could improve the competition in the future. The in-person interviews were video-recorded, transcribed, coded and evaluated.

The above quantitative and qualitative data collection procedures were repeated in the 2019–2020, 2020–21, 2021–22 and 2022–23 school years of the radio drama competitions.

This methodological triangulation helped reduce the risk of any potential bias from the interviewer during the

in-person interviews. It also helps confirm if the quantitative data supports the feedback received from the qualitative in-person interviews.

4.3 Data Analysis

To answer RQ1, a multi-year cross-sectional analysis was performed in this study to triangulate and evaluate the internal consistency and reliability of the quantitative data. ANOVA tests were also conducted to examine the differences, if any, among data collected from the four years of the competition. We would also combine our findings from the in-person interviews. We also examined through the in-person interviews whether the radio drama competitions improved students' critical thinking, problem solving and collaboration competencies.

To address RQ2, we studied the interview texts from our in-person interviews and looked for insights and examples on how teachers integrated the radio drama competitions in their curriculum.

5. Results and Discussion

5.1 Online Survey Results

Table 1 shows the summary of the online survey data collected in 2019–2020, 2020–21, 2021–22 and 2022–23 school years of the radio drama competitions.

Table 1. Cross-sectional Descriptive Statistics on the Usefulness of the Radio Drama Competition to Improve Collaboration and Teamwork by all Respondents (1-5; 1=strongly disagree and 5=strongly agree)

Year	N	Mean	SD	Std. Error
2019-2020	50	4.46	0.54	0.08
2020-2021	186	4.08	0.60	0.04
2021-2022	109	4.43	0.66	0.06
2022-2023	111	4.16	0.85	0.08

The mean scores for all four years indicate respondents agree that the radio drama competition is a useful tool to improve collaboration and teamwork, on average, 4.46 in 2019-2020 ($SD = 0.54$), 4.08 in 2020-2021 ($SD = 0.60$), 4.43 in 2021-2022 ($SD = 0.66$) and 4.16 in 2022-2023 ($SD = 0.85$) respectively on a 5-point scale. As discussed earlier, collaboration competency of our students should be nurtured from a very young age (Aizikovitsh-Udi & Cheng, 2015; Cicek & Palavan, 2017; Legare et. al., 2012) and this competency is an essential one for sustainability (OECD, 2018). The above results suggest that the radio drama competition can help improve students' collaboration and teamwork at the primary and secondary school levels.

Among these four years' data, the year 2020-2021 has the lowest score. One possible reason may have been due to the long periods of school closures during the COVID-19 pandemic. According to South China Morning Post (SCMP, 2022), there were only 25 days of in-person classes (out of a total of 152 days) for students from January to May 2020 because of the pandemic. That was under 17% of the total available school days in those five months. Students were forced to take online lessons from home and found it very difficult to collaborate virtually.

A one-way ANOVA (Table 2) revealed that there was a statistically significant difference in mean score between at least two years' data ($F(3,452) = [8.73]$, $p < .05$).

Table 2. ANOVA Results

ANOVA						
Source of Variation	Sum of Squares	df	Mean Square	F	P-value	F crit
Between Groups	12.00295	3	4.000983	8.728802	1.22305E-05	2.624636
Within Groups	207.1813	452	0.458366			
Total	219.1842	455				

In addition, we examined the reliability of the online survey used in this study (Chan & Tang, 2022). The survey contained eight items and the value for Cronbach's Alpha for the survey was $\alpha = .88$. The above analysis indicates that the results are valid and reliable, and provide consistent results with other drama-related research studies (Sze,

2006; Sunchat, 2005).

5.2 In-person Interviews

The following section describes the in-person interviews conducted with participants of the radio drama competitions. Participation in the interview was completely voluntary. These interviews were conducted after the competition and were video recorded, transcribed, coded and analyzed accordingly. We asked students and teachers if the radio drama competitions improved students' critical thinking, problem solving and collaboration skills.

Table 3. In-person Interview Participants

Year	No. of students	No. of teachers
2019-2020	No in-person interview was conducted this year because of the pandemic	
2020-2021	25	6
2021-2022	26	6
2022-2023	30	7

5.2.1 Students' Feedback

One secondary school student indicated that the radio drama competition enabled him to communicate and work together with the other team members. He enjoyed solving problems together as a team. Another student in the same team thinks working in a team is never easy, yet the radio drama competition allows her to remind herself that "teamwork makes your dream come true". Another team of students suggested that team members had the opportunity to work together and cooperate as a team throughout the competition and that was an experience that they would not forget. One student also stated that participating in the radio drama competition completely changed her teammate's mindset about teamwork and collaboration. The radio drama competition experience allowed her to communicate and work together with others. Now, the student enjoys working and solving problems together as a team.

Students also shared their experience in practicing their problem-solving skills. For example, some primary school students encountered problems with rehearsing their radio drama because they did not have the equipment at home. Students were able to assess the circumstances and resolve the problem by doing rehearsals in a karaoke room and practicing their sound effects there.

A group of primary school students had issues with their computers and audio recording equipment during practice. They understood the situation was out of their control and immediately sought help from their teachers and technical support staff in school. The teachers were able to help them in a timely manner.

Another secondary school team shared that they learned how to overcome challenges during the competition. They had to deal with different kinds of conflicts such as rehearsal scheduling, examination periods, etc. They learned how to compromise, consider different points of view, support each other and solve problems effectively.

The interviews suggested that students were able to develop their collaboration, communication problem solving competencies by participating in the radio drama competition. This echoes UNESCO's proposal of mainstreaming ESD into the curricula of primary and secondary school education (UNESCO, 2017). The interview results also produce evidence illustrating students' ability to understand and respect others with empathy, analyze and evaluate information to make informed decisions, understand the cause-and-effect relationships and develop innovative solutions to problems (UNESCO, 2017; Cicek & Palavan, 2017; Erbay, 2009; Dima, 2021).

5.2.2 Teachers' Feedback

One teacher observed a significant improvement that her students gained from the radio drama competition was their collaborative competence. Her students worked really hard to brainstorm collaboratively, think critically as well as resolve any potential disagreements they might have. And by overcoming these challenges together, the competition helped them formulate a stronger bond and connection with one another and make learning more fun and meaningful.

Another teacher mentioned that students noticeably gained confidence and ownership of their work. They were enthusiastic to share their creative ideas. Students worked collaboratively and respected each other. Teachers made sure it was a safe learning environment where all opinions were valued. Each student played their own role and respected the roles of their fellow team members. It was a collective effort with everyone's input in creating the

drama during the competition.

One secondary school teacher felt there were many benefits for students to participate in the radio drama competition. Students needed to cooperate with others in the competition. That required them to use their 21st century skills, including critical thinking, collaboration, communication and problem-solving skills. In addition, students developed resilience to difficulties because they needed to overcome their weaknesses, solve problems, and constantly look for ways to further improve themselves.

The teacher further explained that the radio drama contest incorporated several key elements in a natural way with a given meaningful context, including creativity, writing, dramatic reading, editing and performance. The sense of ownership to a script originally written by students themselves drove them to perfect their speaking, communication and collaborative skills, thus overcome their sense of insecurity and fear in presenting their ideas and solving problems in the second language.

The quantitative and qualitative data delivered consistent results. For RQ1, the competition participants' responses indicate that participation in the radio drama competition can foster collaboration, critical thinking, and problem-solving competencies among students for sustainable development across the cognitive, socio-emotional and behavioral domains (Figure 1, OECD, 2018; UNESCO, 2017). The radio drama competition can extend learning beyond the classroom, motivate and develop students to become active sustainability citizens. While there have been quite a few research studies on sustainability education in higher education sector (Cebrián et al., 2021; Levesque & Wake, 2021; Berglund et al., 2020; Tejedor et al., 2019; Bürgener & Barth, 2018), this research study provides solid evidence on how sustainability education can be implemented in Hong Kong at the primary and secondary school levels.

For RQ2, we also asked teachers during the in-person interviews if the radio drama competition could be incorporated in the schools' curriculum and what its pedagogical implications might be. One secondary school asked all students from Form 1 to take part in a Learning Across the Curriculum project named "An unforgettable journey". Students had to form their own teams, brainstorm, research, collaborate and come up with a radio drama play script with that theme. The school's English curriculum covered topics such as historical figures, research in biography, story-writing, poetry and appreciation of musicals, etc. for the Form 1 students. That gave some food for thought during the students' research and writing processes. This project was assigned as their Christmas holiday homework so that students could have more time to complete the assignment and rehearse their radio drama programs. Teachers also asked students to perform and rehearse their radio drama program in groups, as well as conduct class and inter-class competitions. Teachers observed that students were more motivated, enjoyed the student-centered learning process where language learning is integrated with subject content learning. Teachers facilitated the process with minimal intervention. This example illustrates an effective way of incorporating radio drama in the school curriculum to develop primary and secondary school students' key competencies for sustainable education (Aizikovitsh-Udi & Cheng, 2015; UNESCO, 2017). As discussed in the previous sections, it is important for students to develop these competencies at a young age (Üstün, Bozkurt, 2003; Fischer et. Al, 2020). In addition, teachers found that the radio drama competition helped students improve their generic skills and they used the radio drama competition as a formative assessment for students to demonstrate their abilities in process writing, teamwork, creativity, critical thinking (review the play scripts of their fellow students critically) and productive skills.

6. Conclusion

This study investigates the use of radio drama competitions to enhance students' collaboration, critical thinking and problem-solving competencies within the sustainable development framework proposed by UNESCO. It emphasizes the significance of fostering collaboration, critical thinking, and problem-solving competencies among students to address the challenges posed by sustainable development (UNESCO, 2017). Our study used a mixed-method approach, including online surveys and in-person interviews, to evaluate the effects of Hong Kong students' participation in radio drama competitions on the development of their competencies for sustainability over a period of four years. Both quantitative and qualitative results indicated radio drama competitions had a positive impact on enriching students' collaboration, critical thinking and problem-solving competencies. Students and teachers also believe these critical competencies for sustainability can be acquired and enriched from the radio drama competition. These competencies help develop global citizens who can nurture more sustainable societies (UNESCO, 2017).

In addition, we discussed how teachers incorporated the radio drama competition in the school's curriculum to enhance learning and teaching of English Language and students' generic skills. For example, radio drama competitions can be integrated in various Learning Across the Curriculum projects where students can foster their

collaboration, communication, problem-solving competencies through experience and reflection, and across the cognitive, socio-emotional and behavioral domains. The radio drama competition offers a platform for students to explore complex sustainability issues, express their creativity, collaborate with other students, solve different problems, and engage with a broader audience.

Future research study suggestions were also proposed in this paper to help us further understand how students' transferrable skills can be nurtured and the goals of Education for Sustainable Development (ESD) be achieved.

Furthermore, this study provides suggestions on how radio drama competitions can be used as an educational tool for sustainability, integrated into primary or secondary schools' curriculum, nurture students' transferrable skills and achieve the goals of Education for Sustainable Development (ESD) at very young age.

7. Limitations and Future Research Considerations

The scope of this study only included four years' cross-sectional data, a longitudinal study should also be considered to evaluate students' improvements in teamwork, critical thinking and problem-solving competences over time. In addition, we could also conduct a research study and examine whether the radio drama competition could foster other ESD competencies. The current research only focuses on collaboration, critical thinking and problem-solving competencies.

Another potential research area could be to develop a rating scale, based on the World Organisation for Early Childhood Education (OMEP, 2019)'s ESD rating scale for early childhood education, for primary and secondary school education. The scale can be used by primary and secondary school teachers to record their progress and identify areas for improvement towards sustainability. We can also use such scale to examine the effects of the radio drama competition on students' sustainability development over different age groups.

References

- Aizikovitsh-Udi, E., & Cheng, D. (2015). Developing Critical Thinking Skills from Dispositions to Abilities: Mathematics Education from Early Childhood to High School. *Creative Education*, 6, 455-462. <https://doi.org/10.4236/ce.2015.64045>
- Berglund, T., Gericke, N., & Boeve-de Pauw, J. (2020). A cross-cultural comparative study of sustainability consciousness between students in Taiwan and Sweden. *Environ Dev Sustain*, 22, 6287-6313. <https://doi.org/10.1007/s10668-019-00478-2>
- Bürgener, L., & Barth, M. (2018). Sustainability competencies in teacher education: Making teacher education count in everyday school practice. *Journal of cleaner production*, 174, 821-826.
- Cebrián, G., Junyent, M., & Mulà, I. (2021). Current practices and future pathways towards competencies in education for sustainable development. *Sustainability*, 13(16), 8733.
- Cicek, V., & Palavan, O. (2017). Impact of drama education on the self-confidence and problem-solving skills of students of primary school education. In *Proceedings of the Fourth International Conference on E-Learning and E-Technologies in Education, Tangerang, Indonesia*, 25(1), 187-202.
- Chan, K. K. W., & Tang, W. K. W. (2022). Radio Drama Competition as an Effective Tool to Boost the Motivation and Self-Confidence of Primary and Secondary School English Learners in Hong Kong. *English Language Teaching*, 15(1), 154-163.
- Dann, L. (2014). Only half the story: Radio drama, online audio and transmedia storytelling. *Radio Journal: International Studies in Broadcast & Audio Media*, 12(1-2), 141-154.
- Dima, A. (2021). Drama education through storytelling strategy develops students' critical thinking skills, *Proceedings of The 3rd International Conference on Advanced Research in Education [Preprint]*. <https://doi.org/10.33422/3rd.educationconf.2021.03.223>
- Dima, A., & Tsiaras, A. (2020). The improvement of critical thinking through Drama Education for students in the fifth grade of Primary school. *Drama Research: International Journal of Drama in Education*, 11(1), 1-19.
- Dewey, J. (1986, September). Experience and education. In *The educational forum* (Vol. 50, No. 3, pp. 241-252). Taylor & Francis Group.
- Erbay, D. (2009). *The Investigation of Effects of Creative Drama Education on Six Year Old Kindergarten Students Auditory Reasoning and Processing Skills* [Ph.D Thesis]. Selçuk University, Social Science Institute.

- Fischer, D., Selm, H., Sundermann, A., & Storksdieck, M. (2020). Storytelling for sustainability: A definition and its implications for education and communication. *Storytelling for Sustainability in Higher Education*, 38-51.
- Huwiler, E. (2010). Radio drama adaptations: An approach towards an analytical methodology. *Journal of Adaptation in Film & Performance*, 3(2), 129-140.
- Levesque, V. R., & Wake, C. P. (2021). Organizational change for sustainability education: a case study of one university's efforts to create and implement institution-wide sustainability competencies. *International Journal of Sustainability in Higher Education*, 22(3), 497-515. <https://doi.org/10.1108/IJSHE-09-2019-0285>
- Legare, C. H. et al. (2013) 'The use of questions as problem-solving strategies during early childhood'. *Journal of Experimental Child Psychology*, 114(1), 63-76. <https://doi.org/10.1016/j.jecp.2012.07.002>
- Maiullo, J. (2018). Radio Drama for Speaking Practice. In *English Teaching Forum* (Vol. 56, No. 2, pp. 16-25). US Department of State. Bureau of Educational and Cultural Affairs, Office of English Language Programs, SA-5, 2200 C Street NW 4th Floor, Washington, DC 20037.
- Mena Araya, A. E. (2020). Critical thinking for civic life in elementary education: Combining storytelling and thinking tools. *Revista Educación*, 44(2), 24-45.
- OECD. (2018). Preparing Our Youth for an Inclusive and Sustainable World: The OECD PISA Global Competence Framework. Retrieved from <https://www.oecd.org/pisa/innovation/global-competence/>
- Olsson, D., Gericke, N., Boeve-de Pauw, J., Berglund, T., & Chang, T. (2019). Green schools in Taiwan—Effects on student sustainability consciousness. *Global Environmental Change*, 54, 184-194.
- Redman, A., & Wiek, A. (2021). Competencies for Advancing Transformations towards Sustainability. *Front. Educ.* 6:785163.
- South China Morning Post (2022). Hong Kong's repeated school closures will have a lifelong impact on children Retrieved from <https://www.scmp.com/comment/opinion/article/3166468/hong-kongs-repeated-school-closures-will-have-lifelong-impact>
- Straková, Z., & Cimermanová, I. (2018). Critical Thinking Development—A Necessary Step in Higher Education Transformation towards Sustainability. *Sustainability*, 10(10), 3366. <https://doi.org/10.3390/su10103366>
- Sze, P. (2006). Developing Students' Listening and Speaking Skills through ELT Podcasts. *Educational Journal*, 34, 115-134.
- Tejedor, G., Segalàs, J., Barrón, Á., Fernández-Morilla, M., Fuertes, M. T., Ruiz-Morales, J., ... & Hernández, Á. (2019). Didactic strategies to promote competencies in sustainability. *Sustainability*, 11(7), 2086.
- Taimur, S., & Sattar, H. (2020). Education for sustainable development and critical thinking competency. *Quality education*, 238-248.
- UNESCO. (2015). Thematic Indicators to Monitor the Education 2030 Agenda. Technical Advisory Group Proposal. Retrieved from <http://www.uis.unesco.org/Education/Documents/43-indicators-to-monitor-education2030.pdf>
- UNESCO. (2017). Education for sustainable development goals: Learning objectives. Retrieved from Retrieved from <https://unesdoc.unesco.org/ark:/48223/pf0000247444>
- United Nations. (2015). Transforming our world: the 2030 Agenda for Sustainable Development. Resolution adopted by the General Assembly on 25 September 2015. Retrieved 16 October 2016 from http://www.un.org/ga/search/view_doc.asp?symbol=A/RES/70/1&Lang=E
- Üstün, A., & Bozkurt, E. (2003). Occupational Factors that Affect the Problem Solving Skills of Primary School Principals as They Perceive Themselves. *Kastamonu Education Journal (March)*, 11, 13-20.
- Üstündağ, T. (1997). The advantages of using drama as a method of education in elementary schools. *Hacettepe Üniversitesi Eğitim Fakültesi Dergisi*, 13(13).
- World Organization for Early Childhood Education (OMEP). (2019). The OMEP ESD rating scale and tool kit. Early childhood education for sustainability and global citizen education (2nd ed. adapted 2019 from the original ESD Rating Scale). Retrieved from <https://omeworld.org/wp-content/uploads/2021/02/2019-Introduction-to-the-OMEP-ESD-rating-scaleENG.pdf>

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