優質教育基金
Quality Education Fund

**M:FR/E**

| **Final Report of Project** | **Project No.: 2017/0226** |
|---|---|

## Part A

Project Title: **Robot Soccer Youth Training Programme**

Name of Organization/School: **Cheung Sha Wan Catholic Secondary School**

Project Period: **From 04/2019 (month/year) to 02/2020 (month/year)**

## Part B

*Please read the **Guidelines to Completion of Final Report of Quality Education Fund Projects** before completing this part of the report.*

Please use separate A4-size sheets to provide an overall report with regard to the following aspects:

1. Attainment of objectives
2. Project impact on learning effectiveness, professional development and school development
3. Cost-effectiveness – a self-evaluation against clear indicators and measures
4. Deliverables and modes of dissemination; responses to dissemination
5. Activity list
6. Difficulties encountered and solutions adopted

Name of Project Leader: _____ Name of Grantee*: _____

Signature: _____ Signature: _____

Date: _____ Date: _____

** Final Report of Project should be submitted via "Electronic Project Management System" (EPMS). Once submitted, these reports are regarded as already endorsed by the supervisor of the school/the head of the organization or the one who signed the Quality Education Fund Agreement for allocation of grant on behalf of the organization.*

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# Guidelines to Completion of Final Report of Quality Education Fund Projects

***Please elaborate the following items in your evaluation of the project. It is expected that the guide would provide a reference to the project leader/team in reflecting on the effectiveness of the project.***

## 1. Attainment of Objectives

The following items should be included in the evaluation of the attainment of each of the project objectives stated in the project proposal *(the information may be presented in a table form in the format of Table 1 in this Annex or in short paragraphs)*:

- objective statement
- activities related to the objective
- extent of attainment of the objective
- evidence or indicators of having achieved the objective
- reasons for not being able to achieve the objective, if applicable

## 2. Project Impact on

The project's effects on the learning effectiveness / professional development / school development should be evaluated, in evidence-based approach, with regard to:

- broadening students'/teachers' horizons
- increasing students'/teachers' sense of achievement
- fostering students' development in their potential and specific abilities
- training students to better meet social demands
- increasing training opportunities for teachers and enhancing their professional development
- improving learning atmosphere
- fostering team spirit and enhancing the overall image of the school
- inducing collaboration with other schools / professional organizations.

## 3. Cost-effectiveness

Grantees are required to complete the 'Budget Checklist' at Table 2 in this Annex and enclose it as an appendix of this report. Please adopt the classification of budget items in Schedule II of the Agreement.

The project's cost-effectiveness should be evaluated with regard to:

- utilization of available resources (e.g. equipment, human resources of applicant school/ participating school(s))
- unit cost for the direct beneficiaries
- sustainability of the learning programme and materials developed
- expenditure items which require no injection of resources when the project is replicated by other schools (including setup cost of the project, deliverables ready for use)
- alternative approaches for equivalent benefits at less cost

## 4. Deliverables and Modes of Dissemination

The following items should be included in the evaluation of each of the project deliverables and their value for dissemination *(the information may be presented in a table form in the format of Table 3 in this Annex)*:

- description of the deliverable (e.g. type, title, quantity, etc.)

- evaluation of the quality and dissemination value of the deliverable
- the dissemination activities conducted (please state the date, mode, etc.) and the responses of the participants/recipients to such dissemination activities
- the value and feasibility for the deliverable to be widely disseminated by the QEF as well as suggested modes of dissemination.

A brief description of the elements/experiences contributing to the success of the project and feasibility of continuing the project should also be given.

## 5. Activity List

Particulars of activities conducted during the project period such as types of activities, brief descriptions of the activities, number of participants and feedback from participants should be reported *(the information may be presented in a table form in the format of Table 4 in this Annex or in short paragraphs).*

## 6. Difficulties Encountered and Solutions Adopted

The information here should explain why the actual project implementation (including the budget, schedule and process) differs from the original plan, if applicable.

**Table 1: Attainment of Objectives**

| Objective statement | Activities related to the objective | Extent of attainment of the objective | Evidence or indicators of having achieved the objective | Reasons for not being able to achieve the objective, if applicable |
|---|---|---|---|---|
| 1. Understand the basic components of a robot<br>2. Understand and distinguish input, processing, and output devices | Build your own robot | Fully achieved | All students finished assembling their robots and explained the component parts and functionalities in front of the class before the end of the lesson. | |
| 3. Understand a robot controlling unit (RCU) and its mechanism and function<br>4. Understand the mechanism and function of an output device and colour screen<br>5. Control and communicate between RCU and screen. Understand the basic programming technique | School and student names<br>Show up emojis<br>Rolling words<br>Traffic Light<br>Challenging task: National Flags | Fully achieved | All students finished showing their own English names and school names, smile emoji on the robot screen. Students also managed basic skills on drawing the national flags of Japan, France, and Switzerland on the robot screen. | |
| 6. Understand the mechanism and function of input device<br>7. Understand the operation, function & application of a light sensor. Get data from an input device to RCU | Light sensors – colour recognition | Fully achieved | All students connected light sensors and retrieved readings to the RCU and showed corresponding colours on the screen before the end of class. | |
| 8. Understand the mechanism and operation of output device and motor<br>9. Control the motors, basic moving and turning, speed control<br>10. Write programs to perform interaction between robots and music beats | Motor control – dancing cars | Fully achieved | All students finished writing programs for their dancing cars and corresponding steps. They followed music beats and performed dance together at the end of class. | |
| 11. Integrate input and output devices. Write programs to perform simple decision making | Line follower | Fully achieved | All students finished the line following task. (follow the black line from the start point to the end) | |
| 12. Understand soccer robot rules and regulations<br>13. Understand hardware and software requirements of soccer robots<br>14. Understand basics of Adobe Illustrator<br>15. Be able to design and build soccer robot | Build soccer robot | Fully achieved | All student finished assembling the soccer robots, integrating all sensor tasks in previous lessons into the soccer robots and successfully | |

| | | | | |
|---|---|---|---|---|
| Understand the method and importance of line-tuning. Enhance problem-solving skills | Robot soccer competition | Fully achieved | participated in a soccer match in the class. | |

**Table 2: Budget Checklist**

| **Budget Items** *(Based on Schedule II of Agreement)* | **Approved Budget (a)** | **Actual Expense (b)** | **Change [(b)-(a)]/(a) +/- %** |
|---|---|---|---|
| Services | | | |
| Equipment | | | |
| General Expenses | | | |

**Table 3: Dissemination Value of Project Deliverables**

| **Item description (e.g. type, title, quantity, etc.)** | **Evaluation of the quality and dissemination value of the item** | **Dissemination activities conducted (e.g. mode, date, etc.) and responses** | **Is it worthwhile and feasible for the item to be widely disseminated by the QEF? If yes, please suggest the mode(s) of dissemination.** |
|---|---|---|---|
| Open MV Cam | In good condition after being used for nearly a year | Stored in Room409 for training course in the future | |
| Mega Soccer Robot Kit V2 | In good condition after being used for nearly a year | Stored in CALL for training course in the future | |
| Mega Sumo Robot Kit V2 | In good condition after being used for nearly a year | Stored in CALL for training course in the future | |
| | In good condition after being used for nearly a year | Stored in Room409 for training course in the future | |
| 教育套件 | In good condition after being used for nearly a year | Stored in CALL for training course in the future | |
| RCJ Soccer Field | In good condition after being used for nearly a year | Stored in CALL for training course in the future | |
| 鋰電池 | In good condition after being used for nearly a year | Stored in CALL for training course in the future | |

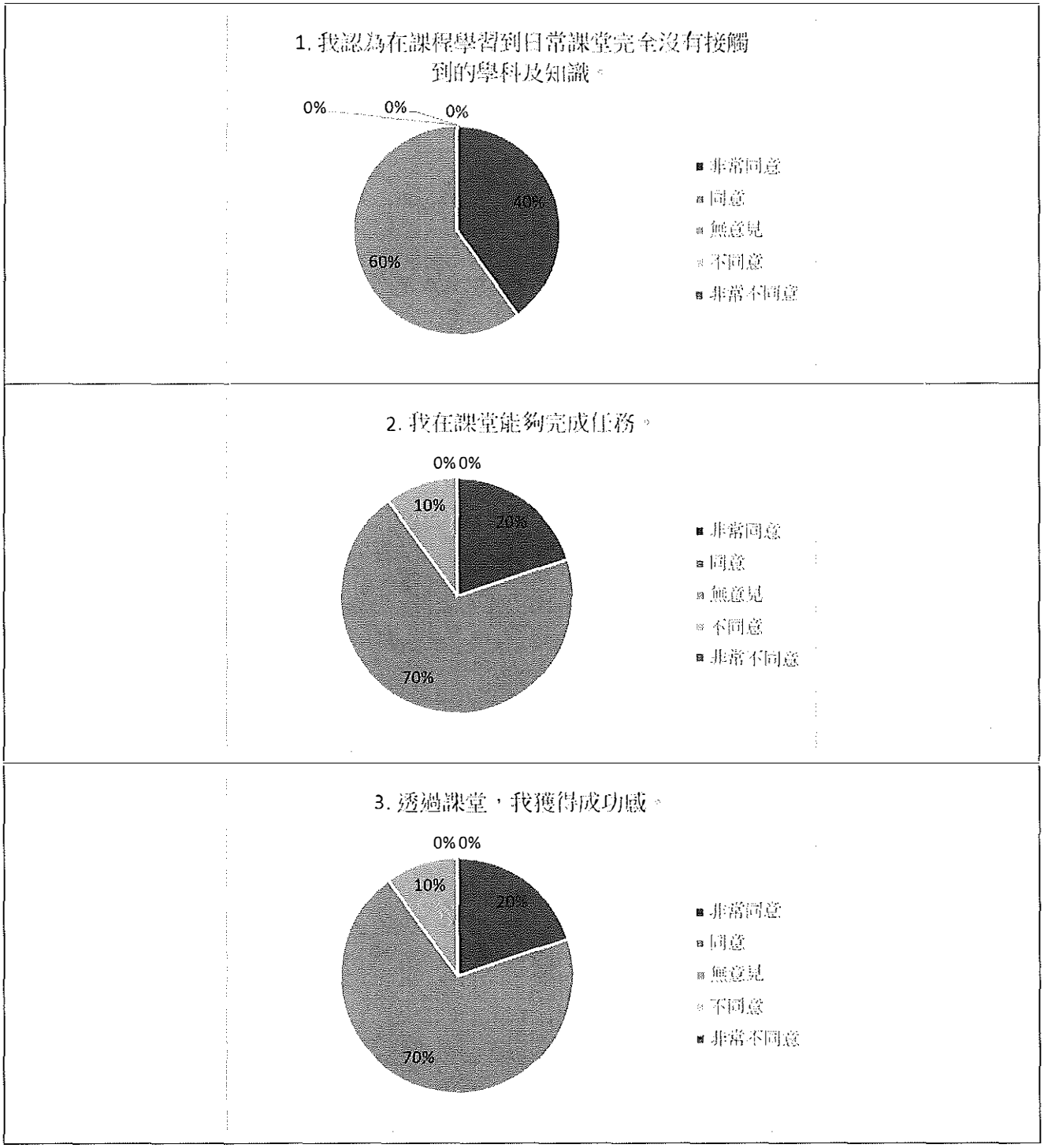
**Table 4: Activity List**

| **Types of activities** *(e.g. seminar, performance, etc.)* | **Brief description** *(e.g. date, theme, venue, etc.)* | **No. of participants** | | | | **Feedback from participants** |
|---|---|---|---|---|---|---|
| | | schools | teachers | students | others (Please specify) | |
| Hong Kong Robotic Soccer Tournament | 3 Aug 2019 CSWCSS MPH | 4 | 8 | 30 | | Participants showed strong interests towards robotic soccer events and advised us to organize the event annually. |
| CSWCSS Information Day | Annual school event, 12 Oct 2019 at CSWCSS | 20 | 100 | 1000 | | Open event welcomed all participants. Student helpers showed strong interest towards the event. Visitors said they would like to study in CSWCSS because we provide such training courses and events. |
| CSWCSS STEM Week | Proposed on 25 Feb 2020 | | | | | Event cancelled due to COVID-19 |
| Courses | From 4/2019 to 2/2020 | | 3 | 20 | | Students showed strong interest towards the robots and they found the tasks in the class exciting. They told us the tasks were different from what they learnt during day classes and they were more fun to learn. The soccer robots were challenging. Students found difficult at the beginning when they got the robots. They said the guidelines given were suitable and easy to understand, not too tedious but not vague. |

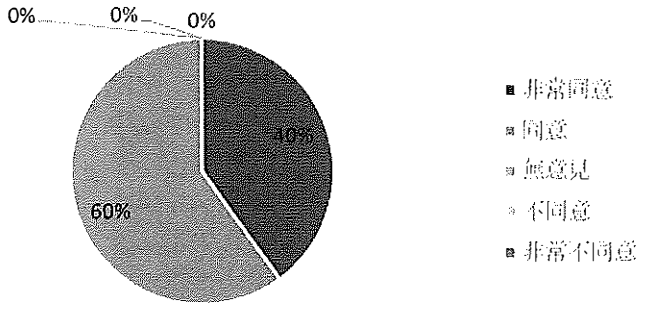
## Table 5: Student Questionnaire Sample on Robot Soccer Youth Training Programme

| | Strongly Agree 非常同意 | Agree 同意 | No Comment 無意見 | Disagree 不同意 | Strongly Disagree 非常不同意 |
|---|---|---|---|---|---|
| 1. I think I have acquired knowledge which I would not know about during day classes. 我認為在課程學習到日常課堂完全沒有接觸到的學科及知識。 | | | | | |
| 2. I think I was able to finish the tasks in the classes. 我在課堂能夠更完成任務。 | | | | | |
| 3. I gained satisfaction through the class. 透過課堂，我獲得成功感。 | | | | | |
| 4. I am able to assemble a soccer robot without teacher's guidance after the class, 完成課程後，在沒有老師指導下，我能夠獨力完成組裝一架足球機械人。 | | | | | |
| 5. I think the learning atmosphere in the class was positive. 我認為課堂的學習氣氛良好。 | | | | | |
| 6. I built positive collaboration with classmates and partners in the class. 我認為在課堂上有和同學及組員建立良好的合作關係。 | | | | | |
| 7. 課程完結後，我和同學或組員的團隊合作能力有所改善。 | | | | | |
| 8. 課程完結後，我的解難技巧有提升。 | | | | | |
| 9. 我會在將來繼續參與 STEM 相關的活動。 | | | | | |
| 10. 我會積極參與機械人足球的課程和活動。 | | | | | |
| 11. 我熱愛機械人學。 | | | | | |
| 12. 其他意見（如有） | | | | | |

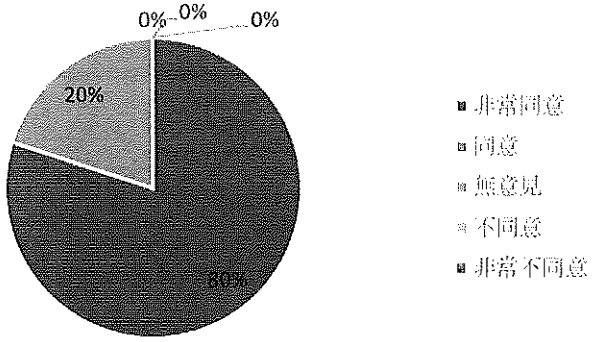
Table 6: Results of the student questionnaire



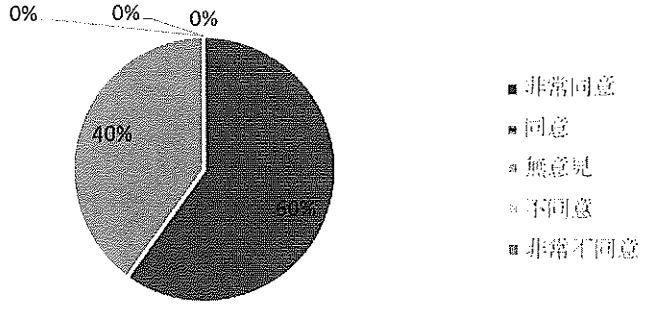
4. 完成課程後，在沒有老師指導下，我能夠獨力完成組裝一架足球機械人。



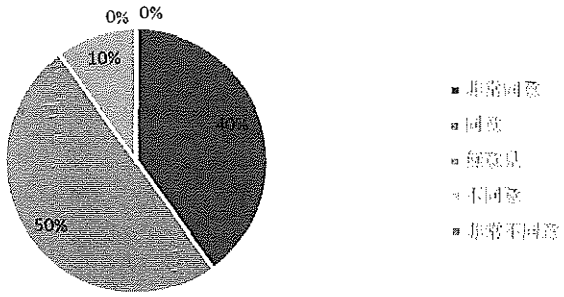

5. 我認為課堂的學習氣氛良好。



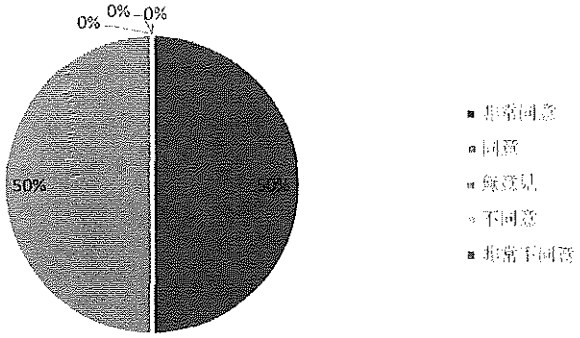

6. 我認為在課堂上有和同學及組員建立良好的合作關係。



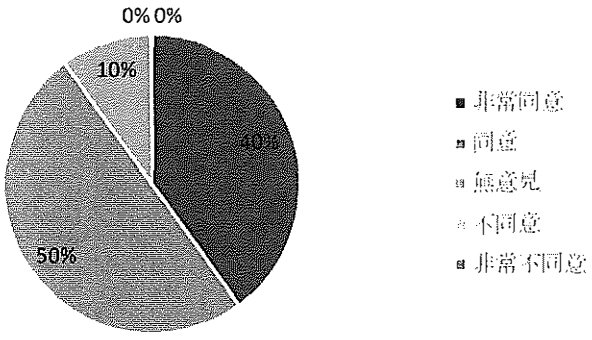
7. 課程完結後，我和同學或組員的團隊合作能力有所改善。



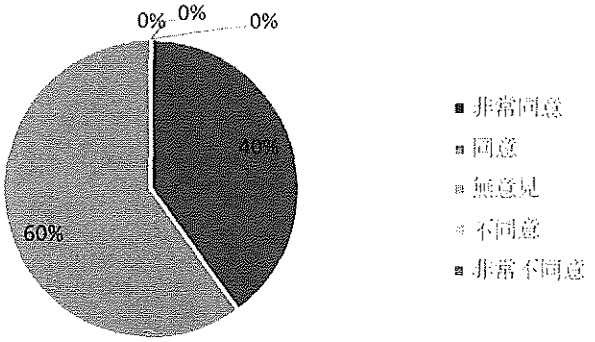

8. 課程完結後，我的解難技巧有提升。



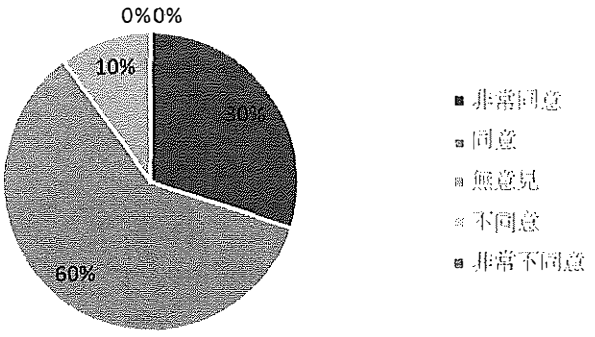

9. 我會在將來繼續參與STEM相關的活動。



10. 我會積極參與機械人足球的課程和活動。




11. 我熱愛機械人學。



## Project Impact

A questionnaire was designed to investigate impacts on participating students after finishing the training programme. The questionnaire was distributed after the last lesson to all participating students. The sample of the questionnaire could be found on Table 5 above and the results were shown on Table 6.

From the results, all students agreed the course provided opportunities for them to get in touch to technology knowledge which they did not know during day classes, broadening students' horizons in the STEM field. 90% of students also agreed that they were able to finish all tasks within the class and they attained sense of achievement during the classes. 80% of students agreed strongly that the class atmosphere was positive, and all students agreed they have built up positive collaboration and improved teamwork skills, thus fostering team spirit of the school. This was also an evidence showing positive impact on learning actively through workshops, applying skills rather than passive learning through chalk and talk.

From the results, all students agreed that they improved their problem solving skills after attending the course, in which a vital skill for student development to better meet the social demand, not only in STEM education field, but also in other aspects in the market.

The results also showed that students were positive towards STEM education and activities related after attending the course. Students were also very positive toward robotic soccer events and showed their passion towards robotics in the results. Such positive effect will foster students' development in their potential in STEM related fields, such as Engineering, Science and Technology etc, and their specific abilities such as hardware i.e. mechanical engineering, and software i.e. computer engineering and computer science fields.