Quality Education Fund

The Dedicated Funding Programme for Publicly-funded Schools

Part B: Project Proposal (Revised)

Project Title: Integration of VR in Effective Learning & Teaching and ECA	Project Number: *2019/1050*

Name of School: <u>Kwun Tong Maryknoll College</u>

Direct Beneficiaries
(a) Sector: ☐ Kindergarten ☐ Primary ☑ Secondary ☐ Special School *(Please put a tick in the appropriate box(es).)*

(b) Beneficiaries: (1) Students: <u>700</u> <u>F1 - 6</u> ; (2) Teachers: <u>55</u> ; (3) Parents: <u>200</u> ;
                 (4) Others: <u>Social workers</u>

Project Period: <u>12/2021</u> to <u>08/2023</u>

1. Project Needs

1.1	Project Aim(s)	The project aims to equip our school with Cave Automatic Virtual Environment (CAVE) system, 360 cameras and notebooks so that students can learn in a more effective and interactive manner. The CAVE system is an immersive and interactive visualisation system, allowing students to experience the developed 3D models virtually. The user wears 3D glasses with motion sensor inside the CAVE to see 3D graphics generated by the system. By immersing students into the CAVE, students can learn abstract and complicated concepts by visualization and interaction. In addition, students can visit different places without any time and space limits. With the help of CAVE system, it is expected that the teaching quality and learning efficiency will be greatly improved. Besides, the concept of VR technology will be used as a main theme of STEM education. Students are expected to learn and understand the principle and applications of VR technology.
1.2	Innovative element(s)	On top of teacher centered teaching methods, CAVE system allows students to learn in a more interesting and interactive manner. Students can immerse themselves into an environment, such as a historical scene, that they could never experience without the system. With the creator software, teachers can create tailor-made teaching materials so that the contents fit the level of the students. Students can also take the initiative to create their own VR tools for various application. At the school level, they can use the CAVE to make presentation or exhibition. We also intend to allow students to observe the needs of SEN students and design tools for SEN training.
1.3	Alignment with school-based / students' needs	In the development plan for 2018-2021, the school aims "To increase the interest in learning through acquiring effective learning methods". The VR technology can help students to learn effectively and arouse their interest in learning. On the other hand, the school established a STEM Team with around 35 students. By using VR technology as a theme of STEM education, these students can update themselves with the principle and application of VR technology and make use of the software to create their own tools. The school also aims "To encourage active participation in and organization of extra-curricular activities, enhancing the sense of responsibility, the sense of belonging, and leadership training". Students can help to plan and design new tools for various activities.

2. **Project Feasibility**

2.1	Key concept (s) / rationale(s) of the project	In 2015, a research from the University of Wyoming concluded that a CAVE system, with proper guidance from teacher, has the ability to engage students to actively participate.[1] In 2018, HKU SPACE[2] and OUHK[3] introduced the CAVE system in their teaching. Based on these experience, it is believed that the CAVE system can help our students to learn more efficiently. In addition, the CAVE system helps to promote STEM education. Students will be able to understand and apply the VR technology in different areas. In the period of 2019-2021, QEF supports HKU SPACE for using VR CAVE for learning natural science (Project No.: 2017/0637).
2.2	Applicant's readiness or ability/ experience/ conditions/ facilities for project implementation	➢ In terms of location, there is a room (Rm 110) ready for the installation of the CAVE system. The room is not occupied for any regular lessons so that teachers can reserve the facilities for their own lessons. 3D printers are also available for printing gadgets for mixed reality. ➢ In terms of supports from the managements, they strongly support the STEM development. Chairpersons of subject panels are willing to explore the possibility of using the CAVE in teaching. ➢ In terms of supporting staff, we have one Science and one Computer teacher as the core members of the project. For the technical support we have two IT assistants. ➢ In terms of students, we have established a STEM Team with around 35 students who have background in coding or programming. They will be the first batch of students to learn to use the software for creating VR tools. These students will be responsible for promoting the use of the CAVE and teaching schoolmates for designing VR tools.
2.3	Principal's and teachers' involvement and their roles	➢ Principal will coordinate the use of the facility. ➢ Core members of the project will be responsible for tendering, following the installation progress, arranging trainings for teachers & students, collecting feedbacks from teachers & students and sharing the outcomes of the project. ➢ Chairpersons of subject panels will discuss with their panel members for designing the lessons and reviewing the efficiency of the teaching using the CAVE system. ➢ Subject teachers will conduct the lessons with the CAVE system. ➢ Moderators of STEM Team will arrange and review the activities for STEM Team by using the CAVE system. ➢ SENCO and social workers will coordinate the use of CAVE system for SEN students training. ➢ Other teachers that will use the CAVE system for ECA activities.
2.4	Parents' involvement / participation (Not applicable)	➢ Parents can experience the school life of their children through the VR cave
2.5	Roles of collaborator(s) (Not applicable)	

1. https://mountainscholar.org/handle/20.500.11919/1804
2. https://elearn.hkuspace.hku.hk/elearning/a-new-cave-for-hku-space/
3. https://www.scmp.com/presented/news/hong-kong/education/topics/ouhk-celebrates-30th-anniversary/article/3031370/ouhk

2.6 Implementation timeline

Implementation period *(MM/YYYY)*	Project activities
12/2021	➢ Establishment of core team of the project. ➢ Tendering and purchase for the CAVE system. ➢ Tendering and purchase for the related renovation. ➢ Tendering and purchase for the furniture. ➢ Tendering and purchase for 360 cameras and notebooks.
2/2022	➢ Installation of the CAVE system in Room 110.
3/2022	➢ Training for all teachers on the uses and daily operation of the CAVE system (3 hours training). ➢ Training for all teachers on lesson design & pedagogies and the use of software (3 hours training). ➢ Training for the core teachers on the use of the software (3 hours training). ➢ Training of for core students on the use of the software (10 hours training).
4/2022-07/2023	➢ Planning on how to use the CAVE in teaching. ➢ Teaching with the CAVE system. ➢ SEN training with the CAVE system. ➢ Review and training for all teachers on the operation of the CAVE (2 hours training). ➢ Review and training for all teachers on lesson design & pedagogies and the use of software (2 hours training). ➢ Review and training for the core teachers on the use of the software (2 hours training). ➢ Review and training for the core students on the use of the software (first 3 hours training). ➢ Review and training for the core students on the use of the software (second 3 hours training).
08/2023	➢ Evaluation of the project

2.7 Details of project activities

a. Student activity

Activity name	Content *(Including the topics, implementation strategies/modes, target beneficiaries, selection criteria, etc.)*	Number of sessions and duration	Teachers' involvement and/or hired personnel *(Including the roles, qualifications and experiences required of the speaker(s)/ instructor(s), etc.)*	Expected learning outcomes
Chinese Language: Understanding Chinese Culture	Topic: F4 students will form groups to showcase different contents of Chinese culture, such as Chinese Kungfu, traditional costumes, weapons, etc. Students will use the CAVE system to illustrate Chinese culture so that they can better understand and appreciate the beauty of Chinese culture. Difficulties: We used to use 2D exhibition board to illustrate the contents. It is easier for students to visualize the details and beauty of the Chinese culture in a 3D manner.	F4 5 sessions; 1 hr for each session	Teachers will guide students to search for the information and help the students to make the 3D contents about Chinese culture.	1. students are able to understand the beauty of Chinese culture 2. students are motivated to learn more about Chinese culture
English Language: Practicing Spoken English	Topic: F1 students will immerse themselves into an English speaking environment for practicing their spoken English. Difficulties: Students have little chance to practice their spoken	F1 4 sessions; 1 hr for each session	Teachers will guide the students to use the CAVE system for practicing spoken English.	1. students are able to speak confidently in an English speaking environment

	English in real situation.			
Mathematics: 2D and 3D Figures	Topic: F3 students use the CAVE to observe the relationship between 2D and 3D figures. Difficulties: Some students have difficulties in visualizing 3D figures in textbooks.	F3 4 sessions; 1 hr for each session	Teachers will guide the students to observe the figures.	1. students are more familiar with the figures and complete the corresponding calculation confidently
Physics:	Topic: Students use the interactive 3D simulations to learn different contents in Physics. Difficulties: Students can hardly imagine the what is happening without visualization. The VR CAVE can serve as a teaching aids on top of experiments.		Teachers will use the simulations as teaching aids to explain different concepts.	1. students are able to understand better the related concepts
	Heat ➢ Specific heat ➢ Heat conduction, convection and radiation	F3 4 sessions; 1 hour for each session		
	Wave ➢ Transverse and longitudinal waves ➢ Factors affecting waves ➢ Propagation of wave ➢ Volume and amplitude	F4 2 sessions; 1 hour for each session		
	Light ➢ Plane mirror imaging ➢ Refraction ➢ Convex and concave lens ➢ Three primary colours	F4 2 sessions; 1 hour for each session		
	Force and motion ➢ Force component on slope ➢ Position, displace and path ➢ Brake reaction time and distance	F4 2 sessions; 1 hour for each session		
	Newtons's Second Law	F4 2 sessions; 1 hour for each session		
	Projectile motion	F5 2 sessions; 1 hour for each session		
	Nuclear power generation	F5 2 sessions; 1 hour for each session		
	Alternator and Lenz's Law	F5 2 sessions; 1 hour for each session		
Chemistry:	Topic: Students use the interactive 3D simulations to learn different contents in Chemistry. Difficulties: Students can hardly imagine the what is happening without visualization. The VR CAVE can serve as a teaching aids on top of experiments.		Teachers will use the simulations as teaching aids to explain different concepts.	1. students are able to understand better the related concepts
	Structure of atom	F3 4 sessions; 1 hour for each		

		session		
	Concentration effect on rate	F5 2 sessions; 1 hour for each session		
	Equilibrium	F5 2 sessions; 1 hour for each session		
	Electrolysis	F5 2 sessions; 1 hour for each session		
Biology:	Topic: Students use the interactive 3D simulations to learn different contents in Biology. Difficulties: Students can hardly imagine the what is happening without visualization. The VR CAVE can serve as a teaching aids on top of experiments.		Teachers will use the simulations as teaching aids to explain different concepts.	1. students are able to understand better the related concepts
	Digestive system	F3 4 sessions; 1 hour for each session		
	Circulation system	F4 2 sessions; 1 hour for each session		
	Skeletal system	F4 2 sessions; 1 hour for each session		
	Mitosis and meiosis	F4 2 sessions; 1 hour for each session		
	Nervous system	F5 2 sessions; 1 hour for each session		
	Nitrogen cycle	F5 2 sessions; 1 hour for each session		
	Reproductive system	F6 2 sessions; 1 hour for each session		
Geography:	Topic: Students use the interactive 3D simulations to learn different contents in Geography. Difficulties: Students can hardly imagine the what is happening without visualization. Particularly for Geography, many scenarios (such as earthquake, landslide) cannot be reproduced in classroom without a VR CAVE.		Teachers will use the simulations as teaching aids to explain different concepts.	1. students are able to understand better the related concepts
	Earthquake	F3 4 sessions; 1 hour for each session		
	Internal structure of Earth	F3		

		4 sessions; 1 hour for each session		
	Landslide	F3 4 sessions; 1 hour for each session		
	Plate movement	F3 4 sessions; 1 hour for each session		
	Water cycle	F4 2 sessions; 1 hour for each session		
	Sea erosion	F4 2 sessions; 1 hour for each session		
	Formation process of Fluvial Terrace	F4 2 sessions; 1 hour for each session		
	High & low of air pressure	F5 2 sessions; 1 hour for each session		
	Cold front	F5 2 sessions; 1 hour for each session		
	Typhoon	F5 2 sessions; 1 hour for each session		
History and Chinese History: Illustration of Great Wall	Topic: F1 students learn history about Qin dynasty. They can visualize the magnificence of Great Wall with the VR CAVE. Difficulties: Students may not be able to visit Great Wall and understand the importance and magnificence of Great Wall without the VR CAVE.	4 sessions; 1 hr for each session	Teachers will show the students the 3D image of Great Wall	students are able to better understand and appreciate the magnificence of Great Wall.
Computer Literacy: Creation of VR Tools	Topic: F3 students will use the creator software to design and make VR tools and apply them in real situation, such as writing a VR game. Difficulties: Students seldom have a chance to make VR games, which would be a good motivation for them to learn more about programming.	20 sessions; 1hr mins for each session	Teachers will guide the students to design and create VR tools.	students are able to use the software for creating VR tools
Training of SEN students	Topic: A group of researchers from Tel Aviv University discovered that there was a significant improvement in ADHD children's social problems and psychosomatic	<u>Observation</u> 3 sessions; 1hr for each session <u>Design and Testing</u>	SENCO and social workers will guide the students to observe the behavior of ADHD students and make	1. students will be more empathetic 2. ADHD students will be improved

	behavior after the training.[3] So students are invited to observe the needs of ADHD students and then design a VR tools to help them for improvements. Difficulties: We have 23 ADHD and 4 ASD with ADHD students out of 47 SEN students. ADHD students may have difficulties in attending lessons. The CAVE system is expected to help SENCO and social workers to train the ADHD students.	5 sessions; 1hr for each session Training 3 sessions; 1hr for each session	the corresponding VR tools.	
School Life Diary	Topic: Students will record their school lives/trips with 360 cameras as a video diaries. The diaries will then be shared with parents and schoolmates. Difficulties: Students used to use photos and words to record their memories in newsletter. Readers can hardly share their happiness.	3 sessions; 1 hr for each session	Teachers will guide the students to use the 360 camera for making 360 videos and inputting them into the CAVE system.	1. students will be familiar with 360 video recording and enjoy sharing their school lives 2. parents will be able to experience the school lives of their children

3. Shirley Shema-Shiratzky, Marina Brozgol, Pablo Cornejo-Thumm, Karen Geva-Dayan, Michael Rotstein, Yael Leitner, Jeffrey M Hausdorff & Anat Mirelman (2019) Virtual reality training to enhance behavior and cognitive function among children with attention-deficit/hyperactivity disorder: brief report, Developmental Neurorehabilitation, 22:6, 431-436, DOI: 10.1080/17518423.2018.1476602

b. Teacher training

Activity name	Content *(Including the topics, implementation strategies/modes, target beneficiaries, selection criteria, etc.)*	Number of sessions and duration	Hired personnel *(Including the roles, qualifications and experiences required of the speaker(s)/ instructor(s), etc.)*	Expected learning outcomes
Training for All Teachers: Introduction of the CAVE System and Daily Operation	Workshops will be offered for subject teachers to learn how to use the teaching packages	10 sessions; 1 hr for each session	Experienced consultants in CAVE system.	1. teachers will be able to understand the potential uses of the CAVE system 2. teachers will be able to understand daily operation of the CAVE system. 3. teachers will be able to able to design lessons & pedagogies with integration of the CAVE system
Training for Core Teachers: Introduction of VR Tools Designing Software and Use of 360 Camera	Training will be offered for teachers who are interested to use the software and 360 camera	5 sessions; 1 hr for each session	Experienced consultants in CAVE system, the VR tools creating software and 360 cameras.	1. teachers will be able to use the software to design VR tools 2. teachers will be able to use the 360 cameras for video recording 3. teachers will be able to import the VR tools and videos into the CAVE system

c.　Equipment (including installation of new fixtures or facilities)

		Details of equipment to be procured	Contribution to fulfilment of the project aim(s) and if applicable, the expected utilization rate
1.		CAVE System Server	For installing the CAVE System so that the system is available for various activities.
2.		Motion Capture System	
3.		3D Projectors x 4	
4.		3D Glasses x 40	
5.		Sound System	
6.		Connection Accessories	
7.		Framework for Supporting the System	
8.	Software	Operating System	For operating the system.
		360 VR Creator	For creating interactive 360 VR.
		VR Tools Creator	For creating interactive 3D simulation.
9.		High performance notebook with a discrete graphic card x 20	For installing the 360 VR Creator and VR Tools Creator.
10.		360 Camera with accessories x 5	For recording 360 videos for 360 VR.
11.		Cabinet with lock x 2	For storing the notebooks, 3D glasses and accessories.

d.　Construction works

	Details of the construction works proposed	Contribution to fulfilment of the project aim(s) and if applicable, the expected utilization rate
1.	Installation of CAVE System	For building the CAVE system.
2.	Flooring	For renewing the floor.
3.	Electrical Wiring and Change of Socket Positions	For connecting the CAVE system to the power supply
4.	Movable Desks and Chairs x 40	For lessons, meetings and other activities.

(Public sector primary and secondary schools, including DSS schools, and special schools should refer to Paragraph 8.6 and other relevant paragraphs in the School Administration Guide. Kindergartens under the New Kindergarten Education Scheme should observe Paragraph 1.2(1)(g) in the Kindergarten Administration Guide.)

e.　Features of the school-based curriculum to be developed, if applicable

➢ Allowing the students to better visualize and understand the teaching contents by using the CAVE system as a teaching aid.
➢ Allowing the students and parents to understand and experience the contents in an interactive manner by using the CAVE system as an exhibition tools.
➢ Equipping the students with updated technological knowledge and ability to solve real life problems through designing the VR tools and making 360 videos.
➢ Making the students to become more empathetic by providing chance for them to apply the CAVE system in SEN training.
➢ Cultivating the interest of the students of using VR technology in their future career.

2.8 Budget

Total Grant Sought: HK$ 775,900

Budget Categories*	Breakdown for the budget items		Justifications *(Please provide justification for each budget item, including the qualifications and experiences required of the hired personnel.)*
	Item	**Amount (HK$)**	
a. Staff	Inappropriate		
b. Service	Teachers' Training for General Operation x 5 hrs	780 x 5 hrs = 3,900	For recruiting experienced consultants to provide training and consultation for teachers and students so that they will be able to operate the system and use the creator software.
	Teachers' Training for Lesson Design & Pedagogies x 5 hrs	780 x 5 hrs = 3,900	The instructors need to be familiar with the operating system of immersive VR, 3D content production, interactive program editor, 3D spatial positioning technology, etc. Since there is no course for this kind of technology in the current academic circles, instructors must have experiences in the industry. The instructors must have at least 3 years of 3D contents development and programming experience in the company that develops and supplies immersive VR. They must familiar with immersive VR system operation and related software development and application experience.
	Teachers' Training for Creator Software x 5 hrs	780 x 5 hrs = 3,900	
	Students' Training for Creator Software x 16 hrs	600 x 16 hrs = 9,600	
	Sub-total for b:	**21,300**	
c. Equipment	CAVE System Server	40,000	For purchasing a highly performed server that is equipped with professional configurations and powerful graphic card, to calculate motion tracking data, perform real-time interaction and generate 4-side of high polygon 3D visuals at 120Hz without noticeable delay
	Motion Capture System	55,000	For purchasing a precise optical tracking technology that can cater multiple users and unlimited tracking targets without intervene, latency of 10ms at most to minimise delay. It also has to be compatible with multi-side VR environment
	Ultra short throw 3D laser projectors x 4	25,000 x 4 = 100,000	For purchasing 3D projectors which are able to generate stable 3D stereo signal at 120Hz so that it can synchronise with each other (4-projector) and 3D shutter glasses to provide non-dizzy real-time 3D rendered visuals without delay. The laser light source is 10 times longer than traditional projector so the maintenance cost of laser projector is extremely low. Also it generates less heat and enjoys a longer product life overall Ultra short throw ratio is required to minimise undesired shadow in immersive virtual environment
	3D shutter glasses x 40	300 x 40 = 12,000	For purchasing rechargeable glasses that can synchronised 120Hz 3D stereo signal of 3D projector, including attachment for perspective tracking of each user
	Sound System	12,000	For purchasing 5.1 system to be connected with the master server
	Connection Accessories	18,000	For purchasing connection cables that are bundled with item the motion capture system and branded signal cables that is able to transmit large volume of data in long distance steadily
	Framework for Supporting the System	38,000	For purchasing movable, free standing metal structure that fits and holds all of the above equipment to the

				right positions and angles without any mounting on wall, ceiling or floor It should come with 4-side of white matt, smooth, finishing wall for projection. The material is replaceable and spare parts will be provided for easy maintenance by any worker. The size of the CAVE would be around (4m x 2 m x 3m).
	Software	Operating System	80,000	For purchasing immersive VR enabler that can drive 4 wrapped sides of real-time 3D rendered images. It should be compatible with various commonly used software and formats, ranging from layman to professional use, thus more students and teachers can take part in VR usage / creation with short learning curve and connect with industry. A library of VR tools for teaching in Physics, Chemistry, Biology and Geography will be included. It should be able to support unlimited import of new content by school users
		360 VR Creator	20,000	For purchasing a drag and drop creator for user to create interactive 360 VR that is compatible with immersive CAVE. It should be suitable for most students and school-based team projects
		VR Tools Creator	20,000	For purchasing a drag and drop creator for user to create interactive 3D simulation that is compatible with immersive CAVE. It should be suitable for students to get familiar with programming logic and curriculum content creation and game design.
	Notebook x 20		7,000 x 20 = 140,000	For purchasing high performance notebooks with a discrete graphic card so that the VR Creator and VR Tools Creator can run smoothly.
	360 Camera with accessories: <table><tr><td></td><td>Quantity</td><td>Amount</td></tr><tr><td>Camera:</td><td>5</td><td>17,000</td></tr><tr><td>Charger:</td><td>5</td><td>2,000</td></tr><tr><td>Selfie stick:</td><td>5</td><td>600</td></tr><tr><td>Battery x 2:</td><td>10</td><td>1,500</td></tr><tr><td>SD card (256 Gb) x 2:</td><td>10</td><td>2,500</td></tr><tr><td>Tripod</td><td>2</td><td>600</td></tr></table>		24,200	➢ For recording 360 videos for 360 VR, e.g. school events or site visits ➢ The battery of the 360 camera should be replaceable, for longer operation (such as Insta360 ONE X2) ➢ Accessories include battery charger, spare batteries, selfie stick, camera tripod, SD cards
	Cabinet with lock x 2		2,000 x 2 = 4,000	For storing the notebooks, 3D glasses and accessories.
	Sub-total for c:		**563,200**	
d. Works	Installation of CAVE System		50,000	For delivering the related materials and building the CAVE system.
	Flooring		25,000	For flattening and renewing the floor.
	Electrical Wiring and Change of Socket Positions		30,000	For connecting the CAVE system to the power supply
	Movable Desks and Chairs x 35		43,832	For lessons, meetings and other activities.
	Sub-total for d:		**148,832**	
e. General expenses	Audit fee		5,000	
	Others		5,000	For printing notes, purchasing materials for activities
	Sub-total for e:		**10,000**	
f. Contingency	Contingency Fee for Renovation Work		14,883	(d x 10%)
	General Contingency		17,685	[(b + c + e - *5,000) x 3%] (* Audit fee)
	Sub-total for f:		**32,568**	
Total Grant Sought (HK$):			**775,900**	

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(i) Applicants should refer to the QEF Pricing Standards in completing the above table. All staff recruitment and procurement of goods and services should be carried out on an open, fair and competitive basis. Budget categories not applicable to this application can be deleted.
(ii) For applications involving school improvement works, a contingency provision of not more than 10% for carrying out works is considered acceptable.
(iii) For projects lasting for more than one year, a contingency provision of not more than 3% of the total budget exclusive of staff cost and works expenditure (including the related contingency provision), if any, is considered acceptable.

3. Expected Project Outcomes

3.1	Deliverables / outcomes	☑ Learning and teaching materials ☑ Resource package ☑ e-deliverables*(please specify) <u>VR Tools & 360 diaries</u> ☐ Others (please specify) _____ After receiving training on how to create the VR tools, teaching resources (e.g. teaching aids, videos) will be produced. Tools for training of SEN students will also be produced. *For e-deliverables to be hosted on HKEdCity, please liaise with HKEdCity at 2624 1000.*
3.2	Positive impact on quality education/ the school's development	➢ There will be a more efficient learning and teaching by interactive teaching ➢ Students will be motivated to learn ➢ Students will be able to learn STEM elements in VR technology ➢ Students can help people in need by designing suitable VR tools

3.3 Evaluation
Please state the methodologies of evaluating project effectiveness and provide the success criteria.
(Examples: lesson observation, questionnaire survey, focus group interview, pre-test/post-test)

> *Review by Teachers*
> ➢ Lesson observations will be arranged and observers will provide opinions for improvements.
> ➢ Discussion and sharing will be conducted in the Panel Heads' Meeting for the teaching efficiency of the CAVE system.
> ➢ Survey will be conducted among teachers to review the efficiency of the project.
> ➢ The project is considered to be successful if over 70% of the teachers find the VR CAVE is helpful.
>
> *Review by Students*
> ➢ Survey will be conducted among students to review the efficiency of the project.
> ➢ The project is considered to be successful if over 70% of the students find the VR CAVE is helpful.
>
> *Review by the Colleagues from Other Schools*
> ➢ Colleagues from other schools will be invited to visit our school and comment on the project.

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For applications with grant sought <u>exceeding $200,000</u>, please complete Parts 3.4 and 3.5.

3.4 Sustainability of the project

> ➢ A library of the teaching contents and VR tools will be developed for future teachings and activities.
> ➢ The project will be launched on the 50th school anniversary next year and the 360 videos will be served as historical records for the school for the coming decades.
> ➢ Senior students or alumni who are experienced in designing VR tools will teach the junior students.

3.5 Dissemination
Please provide a dissemination plan for sharing the good value of the project with the school sector.
(Examples: dissemination seminar, learning circle)

> ➢ Colleague from other schools will be invited to observe the use of the CAVE system.
> ➢ The teaching contents will be shared among the colleague.
> ➢ Seminar will be arranged to share the benefits of the CAVE system.
> ➢ Whenever possible, SEN students from other schools can be trained by the VR tools under the referral of the social workers.

4. **Report submission dates**

The school commits to submit proper reports in strict accordance with the following schedule:

Project Management (Should be submitted via the "Electronic Project Management System" (EPMS))		Financial Management (Hard copy together with supporting documents should be submitted to the QEF Secretariat by mail or in person)	
Type of report and reporting period	**Report due on**	**Type of report and reporting period**	**Report due on**
Progress Report 01/12/2021 - 31/05/2022	30/06/2022	Interim Financial Report 01/12/2021 - 31/05/2022	30/06/2022
Progress Report 01/06/2022 - 30/11/2022	31/12/2022	Interim Financial Report 01/06/2022 - 30/11/2022	31/12/2022
Progress Report 01/12/2022 - 31/05/2023	30/06/2023	Interim Financial Report 01/12/2022 - 31/05/2023	30/06/2023
Final Report 01/12/2021 - 31/08/2023	30/11/2023	Final Financial Report 01/06/2023 - 31/08/2023	30/11/2023

5. **Asset Usage Plan**

Category (in alphabetical order)	Item / Description	No. of Units	Total Cost (HK$)	Proposed Plan for Deployment
audio and video equipment	VR CAVE system: 1. Cave system server 2. Motion Capture system 3. Ulta short throw 3D laser projectors 4. Sound system 5. Connection accessories 6. Framework for supporting the system	1 1 4 1 1 1	263,000	➢ The CAVE will be used for teaching (Chinese, English, Mathematics, Physics, Chemistry, Biology, Geography, History, Computer Literacy) ➢ It will also be used as SEN training and school life recording
computer hardware	Notebook	20	140,000	Students will use them to run 360 VR Creator and VR Tools Creator
computer software	Operating system for CAVE	1	80,000	➢ F3 students will learn how to use the software ➢ Elite students will use the software for activities such as SEN training
	360 VR Creator	1	20,000	
	VR Tools Creator	1	20,000	
office furniture	Cabinet with lock	2	4,000	STEM team will use them to store the notebooks and accessories.
	Movable Desks and Chairs	35	43,832	Students will use them to have lessons and meetings.
Others	360 Camera	5	17,000	All departments in KTMC can borrow the camera for recording their activities.

6. School Declarations

(Note : "The school" hereinafter represents the Kwun Tong Maryknoll College)

1. The school had observed all the rules and regulations on the alteration to school premises (including structural alteration and conversion, change of room use, etc.) and approval was sought from the respective Regional Education Office before project commencement.

2. The school will bear all possible consequences resulted from the related school premises alteration/improvement works, including but not limited to the provision of relevant grants, repair works, etc.

3. The school was reminded that the expenditure items funded by the QEF are one-off. The school will bear the recurrent expenditure incurred, including daily operating costs, etc. and the possible consequences that may arise.

4. In order to ensure the openness, fairness and competitiveness of the procurement of services, the school will conduct quotation/tendering in accordance with the QEF General Guidelines on Staff Administration and Procurement Matter to select the service provider(s).

5. The school should acknowledge the acceptance of the QEF Intellectual Property Rights Policy and confirm that the copyrights of the deliverables/materials should be vested with the QEF. Any reproduction, adaptation, distribution, dissemination or making available of the deliverables to the public by the service provider(s) for commercial purposes is strictly prohibited.