

MCAST EDTECH-INNOVATION OPERATIONAL FRAMEWORK

v1

Propelling MCAST into the 4th Education revolution



Key Projects

Blended Learning

Augmented Reality

Virtual Reality

Artificial Intelligence

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Malta College of Arts, Science & Technology

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EdTech
Network



Changing the Nature of the Game.

Implementing EdTech (**educational technologies**), that is a cluster of disruptive technologies that *'significantly alters the way that users and industries operate. A disruptive technology sweeps away the systems or habits it replaces because it has attributes that are recognizably superior'*.

It is important to clarify what this Framework aims to do, and what it does not aim to do. This framework will define the parameters that lead to identification of viable EdTech initiatives, the collaborative requirements, the general cost expectations, and the key stages of adoption of chosen EdTech initiatives.

The framework will not seek a final commitment to funds or to resources. These will be justified separately through individual project proposals that will follow the general direction and guidance set out by this Framework.

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MCAST EdTech-Innovation Operational Framework

MCAST EdTech-Innovation Operational Framework	1
Executive Summary	3
Section 1 - Context	4
1.1 Characterizing EdTech	4
1.2 Setting MCAST's vision for EdTech	5
1.3 Benefits of adopting EdTech @ MCAST	6
1.4 Purpose of the EdTech Framework	6
1.5 Goals of the EdTech framework	7
1.6 Potential areas of focus	7
1.7 Addressing a Niche Area – VET Tech	8
Section 2 -Building a robust EdTech Ecosystem	9
2.1 Conceptualization of EdTech @ MCAST	9
2.2 Adopting Innovative EdTech Solutions – Key Stages	10
2.3 Building an EdTech Culture	10
2.4 EdTech Operational strategy	11
2.4.1 EdTech Implementation – A shared commitment	11
2.4.2 EdTech adoption strategy	12
2.4.3 Harnessing the Complexity	14
2.5 Supporting a culture change through CPD	14
2.6 The EDTECH FORGE	15

Appendix 1.1 – Example – Implementing Virtual Reality (VR).....	16
Appendix 2.2 - Example of Sample Project Proposal Chart shown for conceptual purposes .	17

Executive Summary

This document lays out the operational framework for the application of Educational Technologies (EdTech) within MCAST. Section 1 highlights and brings together the parameters within which this framework operates. Section 2 outlines the operational framework. The aim of this document is to provide a comprehensive structure on how to use and apply EdTech @ MCAST. Additionally, it guides the policy, resource and practice needs to implement EdTech at MCAST.

The framework aims to achieve the following:

1. Deliver and bring to fruition the innovative Educational Technologies throughout the MCAST ecosystem.
2. Pre-empt the changing students' expectations in educational engagement along their student learning pathway.
3. Address the students' learning needs through the transformation of a hybrid (digital & physical) infrastructure to support equitable Vocational Education and Training.
4. Develop of an EdTech Centre at MCAST – THE EDTECH FORGE

Section 1 - Context

1.1 Characterizing EdTech

Education has remained broadly the same for decades. This scenario is gradually changing with the advancement of technologies that are being specifically developed for use in educational settings. EdTech encompasses all forms of technology - digital learning platforms, digital resources, software and hardware that are available for the modern learning environment. Most of these technologies tend to be perceived as disruptive in nature and have the potential to revolutionize education as we know it. As we pass into the Fourth Education Revolution EdTech upgrades education with 21st century technological solutions.

The primary function of EdTech is to act as a support tool to meet the needs and demands of educational institutions in their teaching and day-to-day management. EdTech solutions can sustain and in instances enhance communication, experiential learning, management of information, curricula development, personalized learning and, omni-synchronous learning amongst various other functions.

Globally the education and learning technology ecosystem has rapidly grown. Investment in this sector is predicted to reach \$342B by 2025. This encouraging outlook is generating an upward spiralling effect in the development of innovative EdTech solutions.

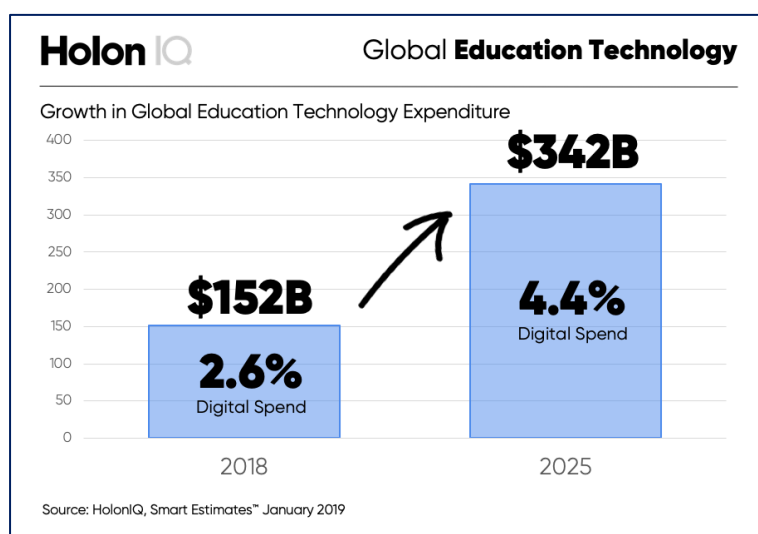


Figure 1- Growth in Global EdTech Expenditure (Source – HolonIQ)

1.2 Setting MCAST's vision for EdTech

The innovation model adopted by the MCAST Applied Research & Innovation Centre (ARIC) is one which sees innovation as a pivotal driver thus pushing MCAST closer to its strategic objectives. Innovation will support MCAST in its' aim to enhance the student learning process and advance in new directions and with new methodologies.

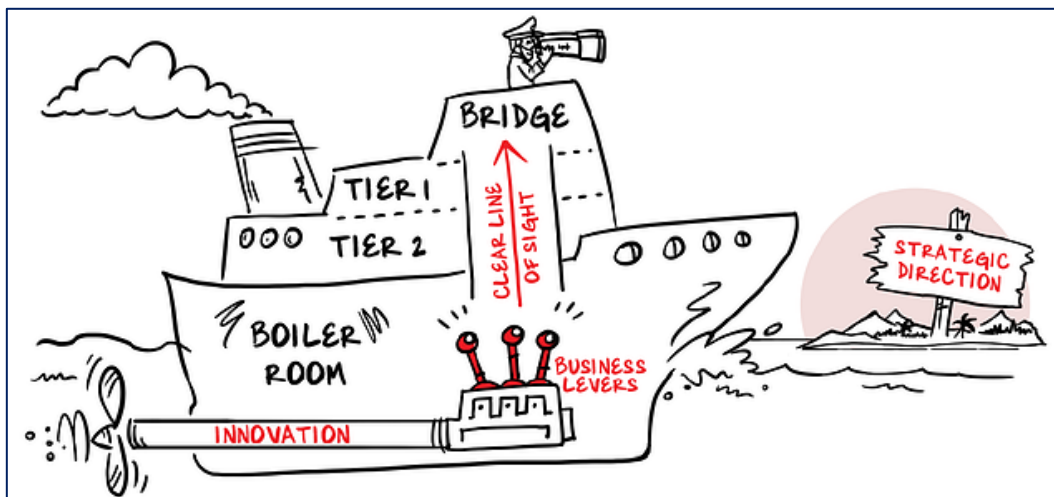


Figure 2 - Innovation as a fundamental driver. (Source – hypeinnovation)

EdTech is fundamental in reshaping MCAST's educational landscape to meet the demands of current and future learners. In tandem, it supports the organization across its operations to reach a hybrid line campus state in which online education is merged with offline education in an omni-synchronous mode of teaching and learning. The EdTech framework addresses MCAST's three overarching challenges: Retention, Progression and Automation.

This framework contributes toward MCAST's strategic plan 2019-2021, specifically to the following directions:

- Upgrade IT infrastructure to **enhance the teaching and learning**. (SD 01)
- Provide students with a **richer experience** that enables all our **students to reach their full potential** (SD 02).
- Widen the availability of **work-based learning** to more students. (SD 03)

- Establish a leading **Applied Research and Innovation Hub** at College level providing expertise to other research teams within and outside the college system (SD 07).
- Stimulate and develop **applied research** at College level leading to **business development, transfer of knowledge and prototypes** (SD 07).

1.3 Benefits of adopting EdTech @ MCAST

	Key EdTech Benefits	Students_MQF L1-3	Students_MQF L4-6	Lecturers	Organization
Learning Process	Personalize the Education Experience	Ability to better cater for all students' needs		More relevant lesson plans	Better Quality outputs
	Makes Learning Fun & Interactive	Improves Engagement & motivation	Able to train in virtual environments		Increase Retention
	Easier collaboration among peers	Support the development of social and co-operative skills		Facilitates teamwork	
	Reflects technological work place	Increased technology skills for Industry 4.0			
	Omni-synchronous learning	Learning facilitated to continue at home		Ability to track home activities	
	Promotes flexible/independent learning	Increased confidence in students	Focus on skills rather than content	Track students progress	Intelligent Tutoring Systems
	More Equitable learning	Learning available to all			More students can be reached
Teaching Process	Expands teacher's toolkit			Adds new dimensions to teaching	
	Pushes students outside of comfort			Reach all students	
	New teaching Methods	Improves Engagement & motivation		Encourages adoption of new methods	
	More Environmentally friendly			Paperless delivery	Lower Carbon footprint
	Support WBL	X-R technologies allow teaching of vocational skills.			
	Motivates students	Encourages students to stay engaged with their learning environment.			
	Enhanced Assessments			New Assessment methods	
Operation	Improves organization and efficiency	Better service to the student			Lowered operational cost
	Improved Career Guidance	Students better prepared for course			Improved outreach
	Improved Student Data & Analysis	Students better managed		Able to better relate to students	Timely Actions to support students
	Tasks Automation			Time saving	Time saving
	Connecting to industry	Solutions to help student in career planning & connecting with industry			Relate to latest tech developments

Figure 3 - Summary of Benefits in Adopting Educational Technologies

1.4 Purpose of the EdTech Framework

The EdTech @ MCAST framework provides a structure through which planning, and goal setting occurs in order to set a clear direction and guidance for all current and future EdTech initiatives. It also aims to provide an operational pathway for future EdTech developments.

The framework ensures that MCAST acts in a coordinated and consistent way, responding to the needs and expectations of MCAST students and the changing needs of VET education.







1.5 Goals of the EdTech framework

The key goals of the EdTech @ MCAST are the following:

- Deliver and bring to fruition the innovative Educational Technologies throughout the MCAST ecosystem.
- Pre-empt the changing students' expectations in educational engagement along their student learning pathway.
- Address the students' learning needs through the transformation of a hybrid (digital & physical) infrastructure to support equitable Vocational Education and Training.
- Develop an EdTech Centre at MCAST – THE EDTECH FORGE

1.6 Potential areas of focus

The following broad opportunities have been identified as of focus:

-  **Work based learning** - providing robust digital work-based experiences.
-  **Experiential learning** – supporting learning through enhanced experiences.
-  **Skills and Competences Development** – innovative EdTech solutions to address the lacuna in technological solutions for students' digital skills and competences development.
-  **Teaching practices** – support access, inclusion and improved education outcomes.
-  **EdTech development and teaching** – provision of select inhouse solutions and a centre of excellence in EdTech programmes delivery.
-  **Specific VET applications** – support very specific EdTech needs in VET eg. Bridge simulations (Maritime Simulator Training).

1.7 Addressing a Niche Area – VET Tech

Most educational technologies and platforms available on the market focus exclusively on theoretical knowledge. VET learners are disadvantaged in the provision of remote training of the much-needed skills and competences related to the vocational area of study. Work-based learning relies on the learner being present at the place of work or laboratory/workshop. This limits the type and amount of learning experiences available to the VET learners.

This gap in technology addressing the needs of VET is an important niche that the framework targets to address. Novel technologies and hybrid innovative solutions shall be creatively applied with MCAST to explore the EdTech needs within the vocational education. Outcomes shall be shared with the local and international VET networks and stakeholders.

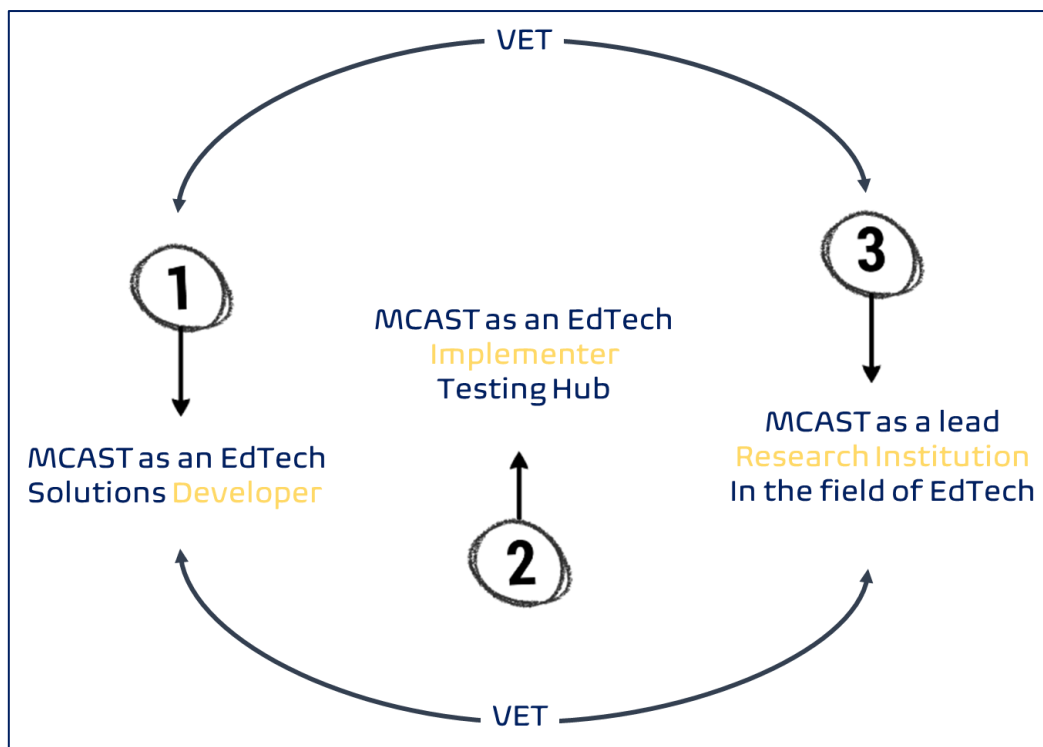


Figure 4 - Introducing EdTech for VET - VETECH

Section 2 - Building a robust EdTech Ecosystem

Through a concerted, consistent and holistic effort, a change in mindset results in the creation of an EdTech ecosystem at MCAST. For the latter to materialize, the focus should be on bringing a change in culture within individuals forming the MCAST ecosystem. This change needs to be supported with an investment in technologies and human resources.

2.1 Conceptualization of EdTech @ MCAST

In line with the ARIC strategy the EdTech framework is anchored on the premises of making existing structures more flexible, and fostering their ability to innovate, react and respond.

The three main underlying pillars:

1. To focus on specific emerging technologies and enhance the students' learning experiences within MCAST.
2. To develop and implement adoption strategies to diffuse and disseminate the use of EdTech solutions across MCAST.
3. To propagate the research findings, developments and in-house applied EdTech solutions externally at a national and international level.

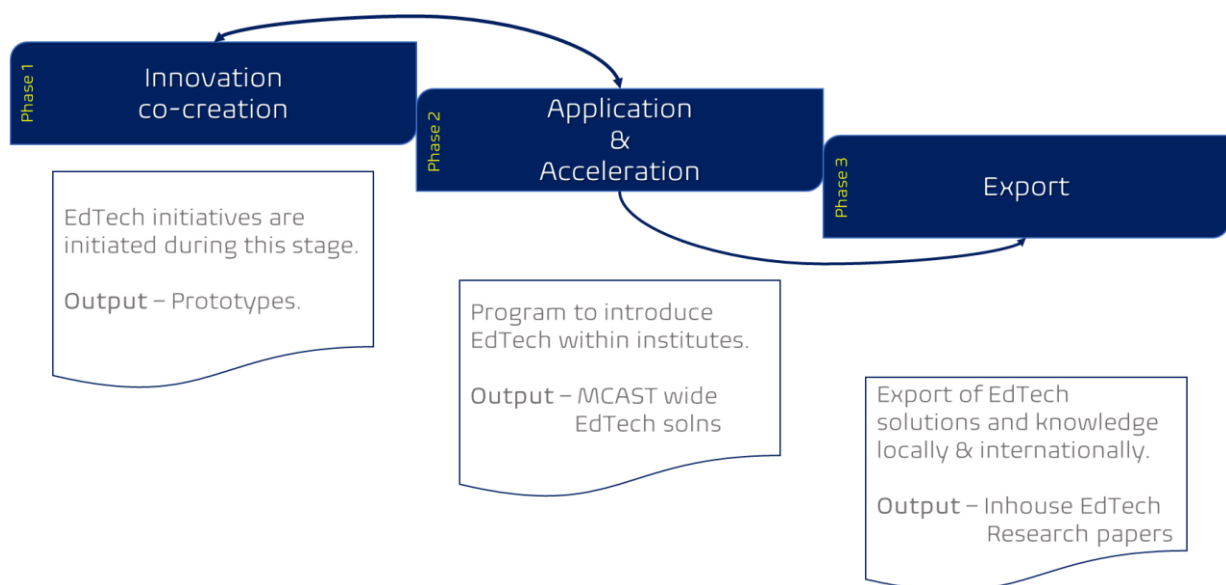


Figure 5 - Phases of EdTech adoption

2.2 Adopting Innovative EdTech Solutions – Key Stages

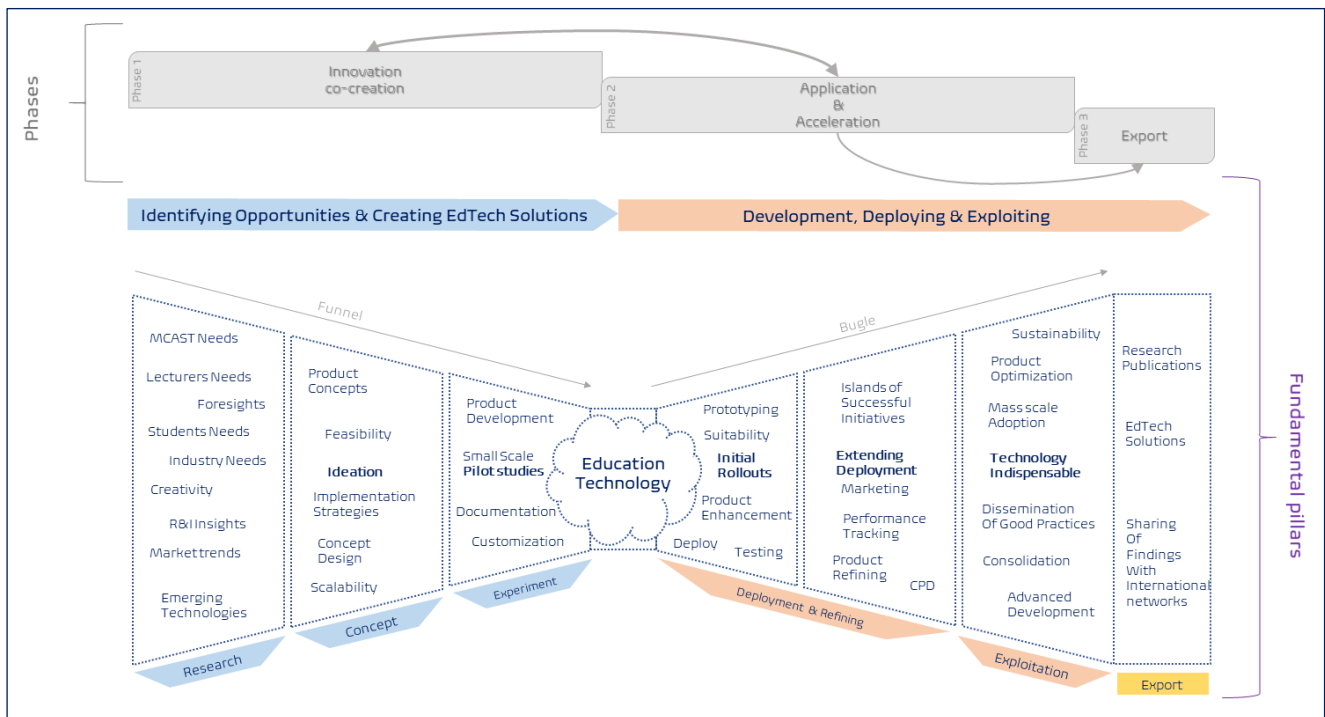


Figure 6 - Fundamental stages for EdTech @ MCAST Framework

2.3 Building an EdTech Culture

Innovation and deployment of innovative solutions is not Plug 'n' Play. Potential barriers to the adoption of novel technologies are the lack of appetite for innovation and the notorious employees' resistance to change. Addressing these barriers is key to the success of the framework and can be achieved by investing in organizational culture change. The success of technological implementations depend entirely on the people adopting it. It is essential that several different MCAST stakeholders work together to bring about the necessary change in culture.

2.4 EdTech Operational strategy

2.4.1 EdTech Implementation – A shared commitment

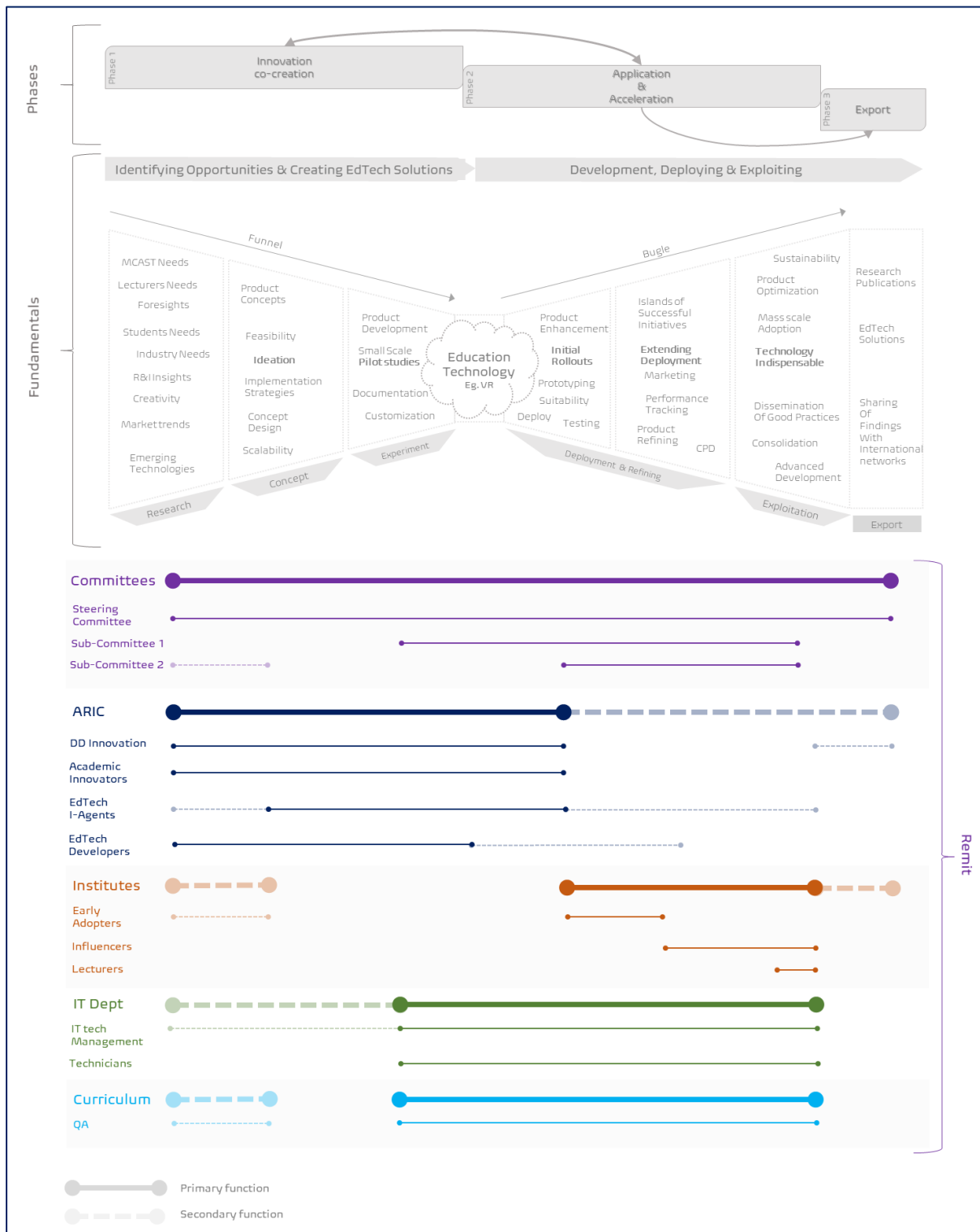


Figure 7 - Key MCAST stakeholders and their respective areas of activity

2.4.2 EdTech adoption strategy

To bring a healthy EdTech ecosystem to fruition, implementation strategy will follow Kotter's eight step approach.



Figure 8 - Kotter's eight steps to bringing about change

This implementation strategy caters for a staggered approach to HR according to varying needs at different point in times. Creating the climate for change (stages 1-3) sees a large involvement of the Innovation team within ARIC. They also contribute to the engagement of change by communicating the strategy and providing relatively fast returns across initial years. These would include the development of VR applications, disseminating the use of blending learning and engaging key AI strategy. The institutes have a leading role in implementing and sustaining change (Figure 7 -stages 7-8).

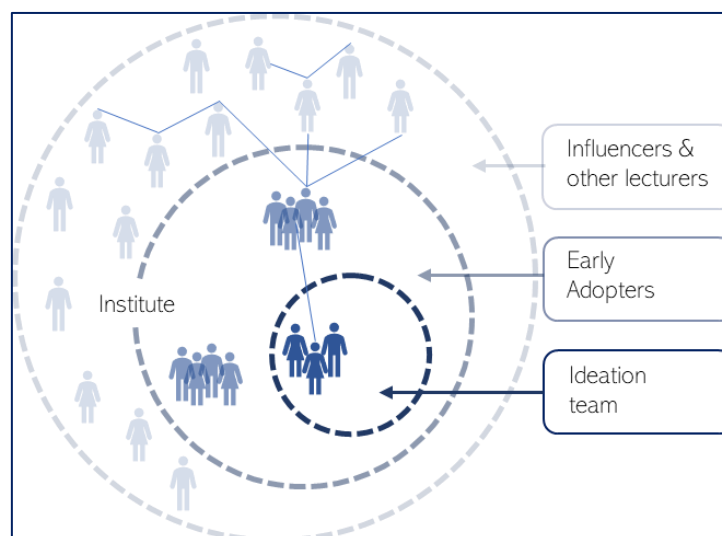


Figure 9 - Diffusion model

The key roles that drive the implementation of an education technology forward are those of subject specific technologists, early adopters (lecturers) and influencers (lecturers). To sustain an organic growth in use of select EdTech solutions a diffusion model of adoption shall be implemented. The growth in use of a given technology follows the diffusion of innovation model. The speed at which critical mass (ie. 85% of the total population using a select technology) is achieved is determined by the investment direction taken by MCAST.

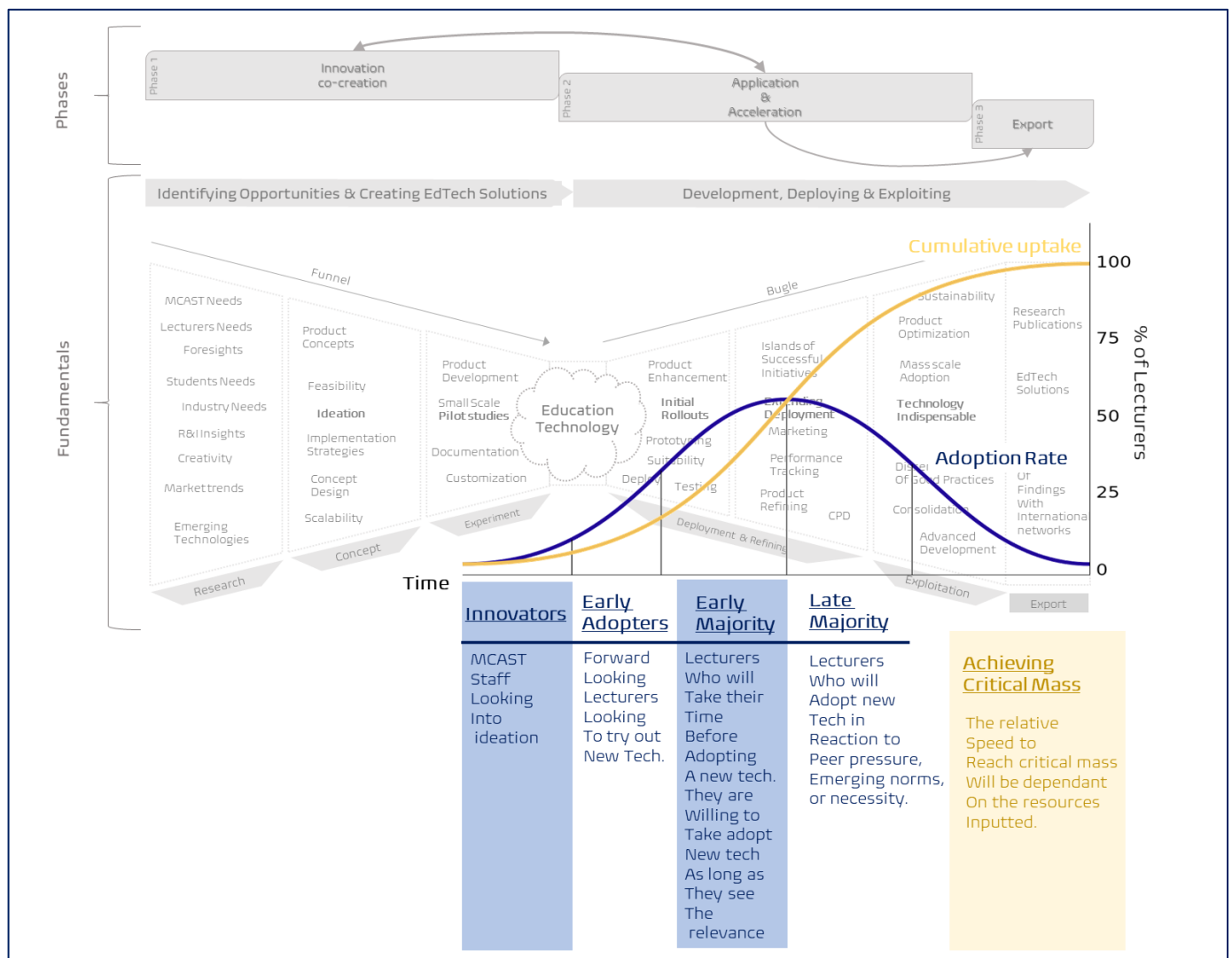


Figure 10 - EdTech @ MCAST Adoption Refinement Strategy

2.4.3 Harnessing the Complexity

The proposed focus-areas of the EdTech initiatives follow a cluster based organizational structure. The clusters are divided according to the major differences between the various educational technologies. This model ensures flexibility, multidisciplinary, innovation and allows room from building a strong EdTech culture.

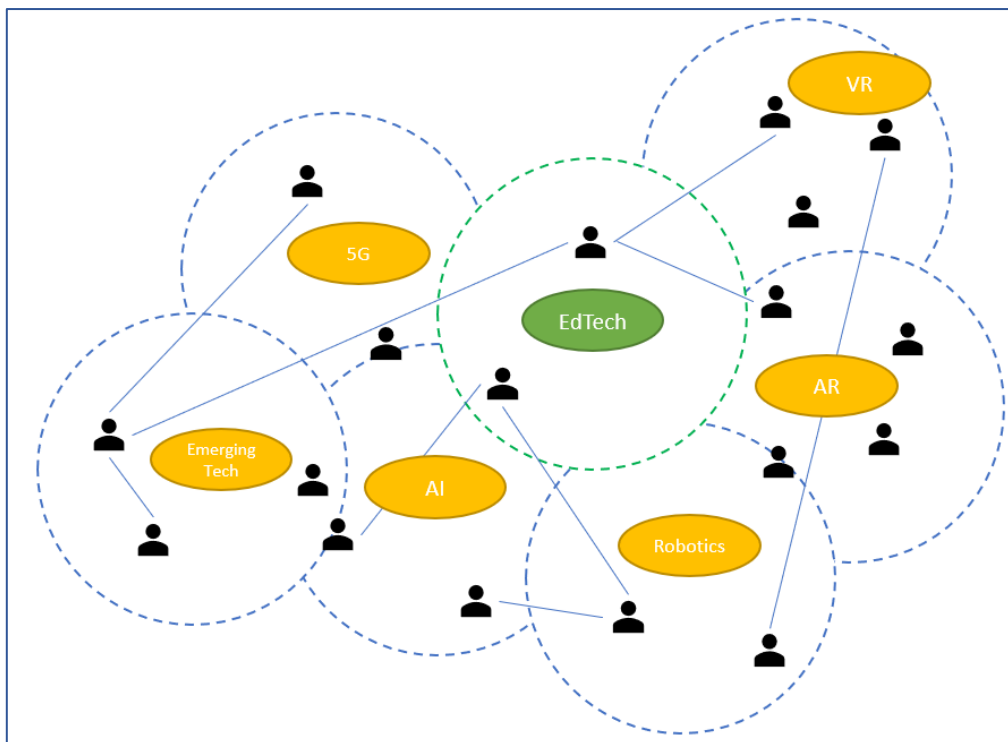


Figure 11 – MCAST EdTech Clusters

2.5 Supporting a culture change through CPD

Continuous Professional Development (CPD) is pivotal to a successful adoption of educational technologies. The reach and scope of CPD and training is broad and categorised as follows:

- ☉ *Informal, one-to-few:* Targeted training sessions for individual staff members.
- ☉ *Formal, one-to-many:* CPD training on applications and use of select technologies being implemented.
- ☉ *Formal, generic:* CPD for lecturers and staff on fundamental concepts relating to Innovation and EdTech.
- ☉ *Formal, accredited:* Provision of accredited units and/or programmes on EdTech.

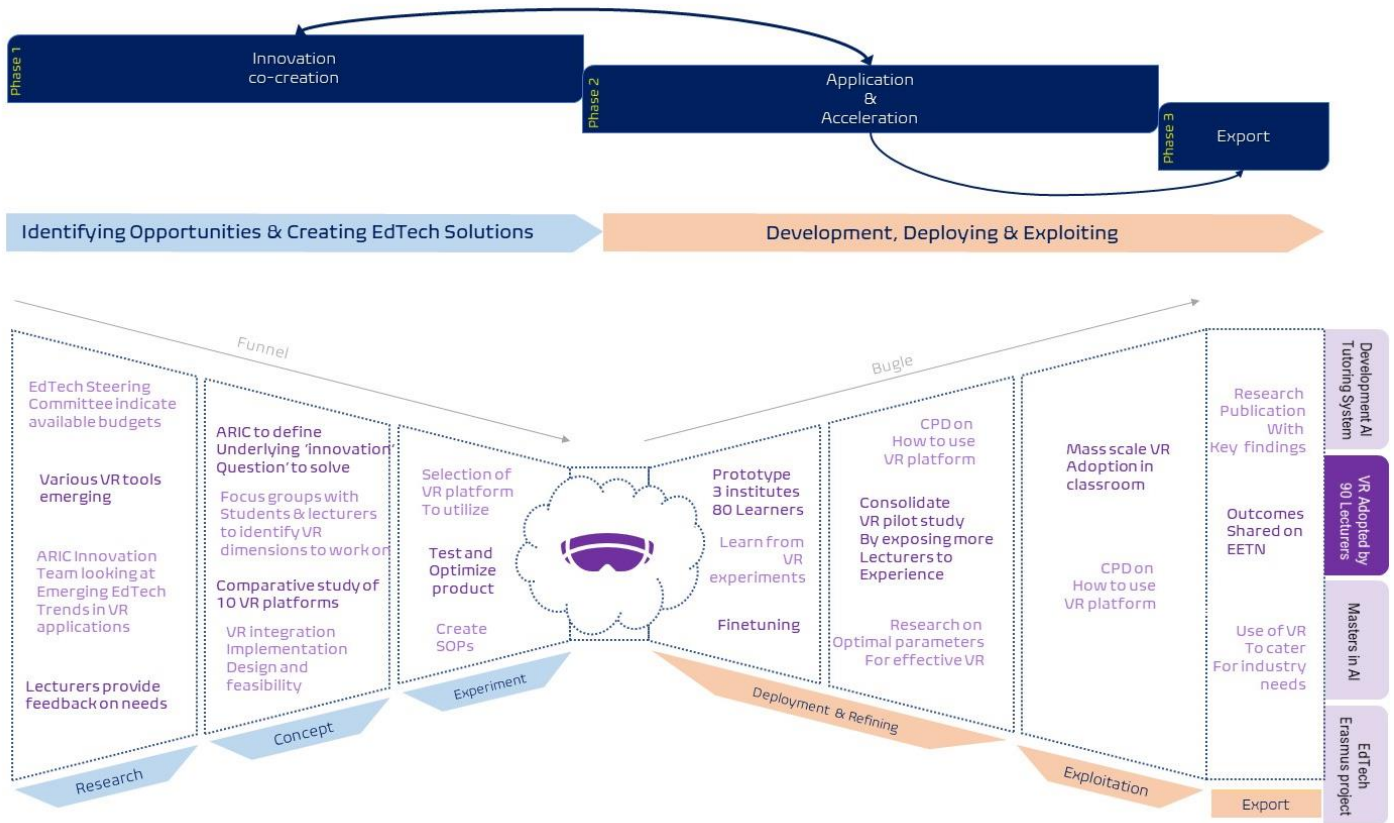
The first three CPD programmes types focus on providing the right knowledge, skills and competences to staff to implement and apply educational technologies in their operations. Formal, accredited courses on the other hand, looks at broadening MCAST's repertoire of programmes in the EdTech field. This supports the consolidation of MCAST's drive to become and maintain leadership in the field and ensures that future MCAST's EdTech initiatives are fully supported through an appropriately skilled workforce. It is envisaged that these programmes range from short specific courses to full programmes at various levels. An example of such a programme would be a Masters in AI particular emphasis on EdTech.

2.6 The EDTECH FORGE

The encompassing values and EdTech operationalization model are proposed to be branded through the '*EdTech Forge*' concept. This is a conceptual ideology that harnesses all the work related to EdTech at MCAST. Additionally, a physical hub dedicated to showing casing EdTech is to share the same nomenclature.

The EdTech Forge concept is chosen as this fully aligns with the EdTech@MCAST vision of creating strong, enduring and successful EdTech solutions.

Appendix 1.1 – Example – Implementing Virtual Reality (VR)



Appendix 2.2 - Example of Sample Project Proposal Chart (shown for conceptual purposes)

MCAST EdTech Project Proposal Chart																												
Proposal Date: xx/xx/xx Sample Project: VR in the MCAST Classroom												Estimated Start: xxxx Project Duration: xx months Estimated Cost: xxxx				Resources P - Main (Primary Function) 5 man-hrs/Wk S - Support (Sec Function) 3 man-hrs/Wk I - Maint/kept informed 0 man-hrs/Wk												
Task ID	FY Phase	Tasks / Deliverables:	Timeline																									
			Duration/Wk	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
				EdTech Steering Committee indicates available budgets		P		I		P		I		I		I										Task Total		
1	Research	EdTech Steering Committee indicates available budgets	8	→																								xxx
2	Research	Various VR tools emerging	12	→																								xxx
3	Research	ARIC innovation team looking at emerging EdTech trends in VR	8	→																								xxx
4	Research	Lecturers provide feedback on needs	8	→																								xxx
5	Concept	ARIC to define underlying "innovation question" to solve	4	→																								xxx
6	Concept	Focus groups with students and lecturers to identify VR dimensions	12	→																								xxx
7	Concept	Comparative study on 10 VR platforms	8	→																								xxx
8	Concept	VR Integration Implementation Design and feasibility	8	→																								xxx
9	Experiment	Selection of VR platforms to utilize	4	→																								xxx
10	Experiment	Test & Optimize product	12	→																								xxx
11	Experiment	Create SOP's	4	→																								xxx
12	Development	Prototype 3 Institutes, 80 Learners	24	→																								xxx
13	Development	Learn from VR Experiments	24	→																								xxx
14	Development	Refining	20	→																								xxx
15	Deployment	Consolidate VR Pilot Study by exposing more lecturers to exper	8	→																								xxx
16	Deployment	Researching, Tendering, Commissioning of VR Equipment and S	32	→																								xxx
17	Deployment	Research on optimal parameters for effective VR	16	→																								xxx
18	Exploitation	CPD on how to use VR Platform	8	→																								xxx
19	Exploitation	Mass scale of VR Adoption in classroom for 125 Lecturers (mi	12	→																								xxx
20	Export	Research Publication with key findings	60	→																								xxx
21	Export	Outcomes shared on EETM	12	→																								xxx
22	Export	Use of VR to cater for industry needs	8	→																								xxx