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Designing remote education in a VUCA world

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Abstract

The goal of this article is to identify and share the best practices and innovations to enable teaching and learning to take place during times of VUCA (Volatile, Uncertain, Complex, and Ambiguous) such as the coronavirus pandemic. This will help lay the foundations for more inclusive and equitable approaches to education when the crisis subsides. The main response to school closures is to dive headlong into academic cyberspace and remote learning, creating a human-machine symbiosis. Ideally, specific contents, learning outcomes, and a set of instructions are desirable. Different media and technologies can be used to assist students to learn in different ways and achieve different outcomes, thus also individualizing learning more. Technologies can be compared along several characteristics. These characteristics form a basis for analyzing new technologies, to see where they fit within the existing environment, and to evaluate their potential benefits and limitations. Nowadays, technologies have a tendency to become more 'communicative' and 'media rich', thus offering educators and students powerful tools to attain desired learning outcomes.

Keywords: VUCA, Remote Education, Technology, Communication, Media.

Introduction

A few months ago, most of us had never heard of the Coronavirus - an unforeseen, exogenous event-now a pandemic [1]. Necessary national measures have been taken to tackle the spread of the virus such as lockdown, curfews, quarantines, travel restrictions, and school closures. Covid-19 outbreak has caused significant disruption to the provision of educational opportunities for more than 1.5 billion students and youth across the planet [2]. We are facing another VUCA environment. What should be the role of policymakers, educational administrators, instructors, and learners in this unprecedented moment of crisis and emergency?

The US Army introduced the term "VUCA" after the end of the Cold War and focused on creating leaders capable of operating in this new setting [3]. Whether stakeholders in education have heard of this term or not, the question is the same. Is it possible to tell with reasonable certainty what the educational environment will be like a year from now? Can anyone predict how many people will be infected with coronavirus in the coming months and how many will die? When will a treatment or vaccine for coronavirus be available? Can anyone know when schools will reopen? Will national and international examinations take place as scheduled? We are facing a black-swan event (events nobody believes to be possible until these happen) in a VUCA world.

As the Coronavirus continues to spread worldwide, there is a lot of uncertainty around how it will affect students' learning and eventually their academic performance. These circumstances are forcing Education Ministries and schools worldwide to create plans swiftly to maintain connections with students and make learning possible even when no one is in the school building [4]. Current educators did not prepare for such a situation. However, times of VUCA require daring innovation -a set of skills that enables the continuous realization of the desired future [5].

Table 1: VUCA terms and their meaning [6], [7], [8]

VUCA terms	Explanation of each term
Volatility	We live in a world that is becoming more unstable day after day, where changes are frequent and more erratic. As events develop in completely unpredicted ways, it is becoming tough to determine cause and effect. One way to interact with the VUCA world is through constant learning, access to new information and new technologies.
Uncertainty	Historical forecasts and experiences are not very effective to forecast events or envisage how they will unfold. It is becoming very challenging to plan for development and growth as timing and magnitude of change are irregular. Promoting agility, being proactive, preparing for constant change and learning to adapt will prime the institution for growth and can be a real competitive advantage.
Complexity	In our increasingly complex world, impediments and their implications are more multi-layered, making it tough to get an overview of how things are related. Selecting a single correct path is almost enigmatic. It is essential for knowledge workers to start thinking in new ways, exploring new solutions, and innovate.
Ambiguity	One size fits all, routines and best practice are rare. Nothing is black and white – grey is more common. The demands on modern organizations are incongruous. Making decisions requires audacity, alertness, and a preparedness to make mistakes.

In this VUCA era, educators and administrators need to learn new skills promptly. As from now, teachers and administrators alike need to accept that they have to venture into full-scale remote learning which involves the unpredictable and the uncomfortable. They cannot rapidly change that, so they should turn their priorities to what is within their control. This is not a time for scripted lessons and rigid implementation. This is a time for educators to focus on core learning priorities, to be intentional in how to support students, to continue learning, and to be flexible in their expectations [9]. It is a tremendous disruption to each school's activities and asks a great effort to all stakeholders alike. In this VUCA scenario, educational administrators and teachers need primarily to:

- stay calm, because students need stability and they are the role models;
- care for their students and make sure everybody feels welcome, understood, appreciated and loved;
- make small decisions swiftly, learn from them, and adapt so that they can survive in the current VUCA situation and are not overwhelmed by the dire circumstances.

The educational value of communication technologies

It is imperative to understand the characteristics and affordances of different types of technologies to have a clear idea of their possible usefulness or limitations for remote education. This will also allow us to appreciate which technologies have common or different features. Communication technologies have a wide range of characteristics but those particularly important for education are [10]:

1. broadcast (one-way) or communicative (two way) media;
2. synchronous or asynchronous technologies;

3. single or rich media.

Broadcast and communicative technologies

Broadcasting is the diffusion of audio or video material to a scattered audience via any electronic mass communications device [11]. Television, radio, video, telecast, podcast, and blog are examples of broadcast or one-way media, as end users cannot change the 'message'. However, they may interpret it differently or even choose to ignore it. An advantage of broadcast media and technologies is that all students receive common and usually consistent educational materials. Public interest media like radio and television also ensure that the doors of education are not closed for students who do not have access to technology or internet connectivity, especially those from disadvantaged families. In addition, broadcast media enable the institution to control and manage the information that is being transmitted, maintaining quality control over the content. Broadcasting media and technologies such as recorded lectures and blogs are more likely to be chosen by educators with an 'objectivist' approach to pedagogy since standard materials are given to all students. The disadvantages are that it does not permit interaction with teachers or other learners, there is no immediate feedback, it is not media-rich and it does not cater for multiple intelligences.

Video-conferencing, webinars, online discussion forums, and most social media are examples of communicative media or technologies, in that all users can interact with each other. Web sites can differ on where they are located on this dimension, depending on their design. For example, online quizzes allow students to interact, though they are not able to 'communicate' or change the content. The educational significance of communicative media is that they enable interaction between educators and students, allows immediate feedback and are usually media-rich, thus catering for multiple intelligences. Furthermore, the use of different media (text, graphics, audio, video, animation, simulations) in communicative technologies better suits learners with different learning styles and needs [10]. A deeper understanding of complex processes is also better achieved by the mental integration of content acquired through different media derived from a variety of sources [12].

The role of the educator tends to be very different when using broadcast or communicative media. In broadcast media, the role of the instructor is significant as the content is chosen and delivered by him. However, in communicative media, while the teacher's role may still be dominant, as in videoconferences, there are learning situations where there may be no specific dominant figure, with contributions coming from all members of the community. Thus, every member of a learning community contributes to the process of knowledge development and dissemination, a constructivist approach [10]. The vital choice for an educator is deciding on the desired balance between broadcasting and communication media. The decision will depend on how much the teacher is at ease with technology and what facilities are available in terms of hardware, software, networks, and services.

Synchronous or asynchronous technologies

Synchronous technologies require all those involved in the communication to participate together, at the same time, although not necessarily in the same place. Videoconferences, webinars, and chat conversations are examples of synchronous technologies [13]. The advantages are that they enable interactions, questioning, and sharing of ideas. For effective synchronous lessons, strategies that can be used include advance mobilization of resources, explicit instructions to learners and clear learning outcomes [14].

Table 2: Examples of Synchronous and asynchronous communication

Synchronous	**Asynchronous**	The flexibility of Internet technology creates intermediate areas around the concepts of synchronous and asynchronous means of communication. For example, video and audio sessions can be recorded and made available for learners who cannot attend a live event.
Chat	E-mail	
Instant Messaging	Discussion forum	
Video and audio conference	Wiki	
Live webcasting	Blog	
Shared Whiteboard	Recorded lectures	

Asynchronous technologies allow participants to access materials or communicate at different points of time. All recorded media are asynchronous. Books, DVDs, YouTube videos, lectures recorded through lecture capture and available for streaming on-demand, and online discussion forums are all asynchronous media or technologies (**Table 2**). Learners can log on or access these technologies at times and the place of their choice, offering more flexibility and control [15].

Media richness

Media richness is increased by incorporation more means of communication. Textual material from an early stage integrated graphics and drawings as well as words to increase richness. Television or video integrates audio as well as static and moving images. Multimedia is the integration of many types of media such as text, graphics, still images, audio, video, animations, simulations and interactive contents in the same information unit. When an assembly of digitally linked contents is created through which the user can navigate, interactive multimedia becomes hypermedia [16]. Multimedia applications have evolved to a stage of causing a paradigm shift in information transfer and presentation.

Well-designed videos very effectively exploit the power of audio combined with dynamic graphics to engage the audience. However, there should be adequate preparation before recording to ensure that processes are demonstrated correctly and clearly. Length of videos is also important. For example, short videos of around 10 minutes are more easily absorbed than a continuous video of 50 minutes.

But how rich should media be for effective learning to take place? When students are presented with too much information at too complex a level or too quickly for them to assimilate, cognitive overload may occur [17]. Vygotsky's Zone of Proximal Development or ZPD (the difference between what a learner can perform without assistance and what can be done with help) should be taken into account when preparing rich media.

From a teaching perspective, rich media have advantages over a single medium of communication, because rich media enable the educator to cater for multiple intelligences. Many science practical, mathematical reasoning or physical exercises can be recorded in a multimedia layout and made available for viewing at any time. Sometimes, processes that are too costly to demonstrate in a classroom can be shown through animation, simulations, video recordings, or virtual reality.

Implementation of remote learning

In a VUCA environment, the locus of learning shifts from the classroom boundaries, to a 24/7, always-on platform - a remote learning atmosphere. However, educators and administrators for whom remote learning seems daunting need support and guidance to use the resources available optimally. Every educator needs a

framework to help determine how resources and digital tools available can be used to have the desired effect. Therefore, to implement remote learning successfully and in line with core educational principles and objectives, each educator needs to assess his specific situation:

- What do I want to achieve, and what is my capability to achieve it?
- What is considered valid forms of learning regardless of physical setting?
- What are the core learning priorities for my class? For my students?
- When it comes to interactions with content and interactions with students, what forms are comfortable for me?
- What forms of interactions would serve the core learning priorities and enable effective learning to take place?
- Will this differ from student to student, and am I prepared to facilitate that diversity in instruction?

The easiest activities to set up remote learning activities are [18]:

Content production and collaborative writing - there are various free or cheap methods to set up a word processing document online. Examples: Google Classroom, Zoho, Dropbox Paper. Google Docs help interactions such as the editing and commenting on a shared digital document. Assigning collaborative tasks (posters, projects, group discussions, etc.) by pairing or grouping students can promote motivation and increased participation.

Short screencasts - Making short videos to explain core concepts and embedding them on Google Classroom gives students that personal connection with their teachers and it can be done using simple apps such as 'Flipgrid'. Students record themselves (e.g. reading a poem aloud) and then post those videos.

Multimedia presentations - Powerpoint can be used for multimedia presentations, but more complex infographics and interactive presentations are possible. Examples: Beautiful.ai, Slides.com, and Piktochart.com.

Quizzes, polls, and surveys. These are easy to set up online. Examples: Easypolls, SurveyMonkey, and Typeform.

Games and simulations - Many options for educational games online are available. Examples: PhET interactive simulations, National Geographic Kids, The World's Future.

Video chatting and conferencing - Many free or built-in applications are available. Examples: FaceTime, Microsoft Teams, Zoom. Learners should be encouraged to maintain a journal to note down their difficulties and queries on assignments, which in turn should help teachers to have productive lessons/questions & answers sessions.

Social media are only just being integrated into formal education, and their main educational value has been in non-formal education, such as fostering online communities of practice. However, they have much greater potential for learning [10] as students in our educational institutions today are from Generation Z, a generation that has grown up in a truly globalized and technological world. This generation, mostly defined by the terms FOBA (Fear of Being Alone) and FOMO (Fear of Missing Out), express their expectation generally through sharing, instant communication, and feedback through apps like Facebook, Twitter, Instant Messenger, Snapchat, and WhatsApp.

Setting up online learning management

Learning management systems may be used to store lecture notes in the form of slides, or PDFs, links to online readings may be provided, or online forums for discussion may be established. Thus, online learning can be blended with face-to-face teaching. If a lecture is recorded, students can view it in their own time, and then the 'online classroom time' can be used for more interactive sessions, leading to a model known as 'flipped classroom'.

LMSs provide an online teaching environment, where content can be loaded and organized, as well as providing 'spaces' for learning objectives, student activities, assignment questions, and discussion forums [10]. Learning management systems (LMS) are used to set up online learning. An LMS stores unit and course plans, and often has activities built into it such as discussion forums, quizzes, and e-portfolios.

There are also open-source options for learning management, but need to be set-up and maintained by an IT specialist [18]. Examples are:

• Google Classroom (https://classroom.google.com)

• Moodle (moodle.org)

• Opigno (https://www.opigno.org/en)

How to ensure that online teaching does not disadvantage students?

Effective online teaching is not the same as face-to-face classroom learning. It requires different activities that are suitable online. However, learners become disadvantaged if they are not provided with certain resources for learning independently and online [18]:

Access to devices appropriate for online learning - Some learning activities can ensue using smartphones and tablets.

Internet access - Poor bandwidth can make many synchronous activities very difficult, thus asynchronous activities should be favored. For students who do not have access to technology or internet connectivity, especially those from disadvantaged families, mobile check-ins and public interest media like radio and television can help sustain education.

Shorter class times with fewer students - Changing teaching schedules to shorter class times and more meetings but fewer students at one time are more effective in online learning situations. If meeting times are combined with collaborative activities, students are more likely to log on and complete tasks or discussions.

Effective feedback - Ample feedback and communication between instructor and learner are essential. Students can also get valuable feedback automatically from online quizzes in addition to direct comments or discussion from classmates and educators.

Opportunities for independent learning – In any situation, students are learning informally all the time. Designing learning activities and discussions that capture students' experiences while keeping them engaged gives teachers valuable feedback on how the learners are feeling. It also provides prospects for multiple viewpoints in learning that might not happen if students were all physically together in a classroom.

Conclusions

Today, the horizon of human knowledge and understanding is expanding very fast, thus creating new avenues for teaching and learning. Technologies are becoming more 'communicative' and 'media rich', thus offering

educators and students effective tools to attain desired learning outcomes. In a world where knowledge is only a few 'clicks' away, the potential exists for educational institutions to enable continuous learning and evaluation in times of VUCA. A time of crisis is also an opportunity for educational institutions to think about the future, adjust to possible threats, and build their capacity. Knowledge workers need to understand that a VUCA environment asks for audacity, agility, alertness, exploration of new solutions, innovation, and preparedness to make mistakes. The notion of a playlist as a list of tasks that students should address on their own time to personalize their experiences changes the when, where and what of learning. This will have positive implications for higher education and beyond - as skills must be constantly developed through life to cope with new occupational and community challenges and opportunities. Finally, if educators commit themselves to ensure that their students continue to have access to quality education even in times of crisis, the level of students' respect towards them will increase, something that has been in decline recently.

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