



The Impact of the Covid-19 Pandemic on XR as a Learning Technology

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Aug. 11, 2021

Steps:

1

Assessing the impact of Covid-19 on education

2

Review of the impact of Covid-19 on educational XR

3

Develop a 3-part framework

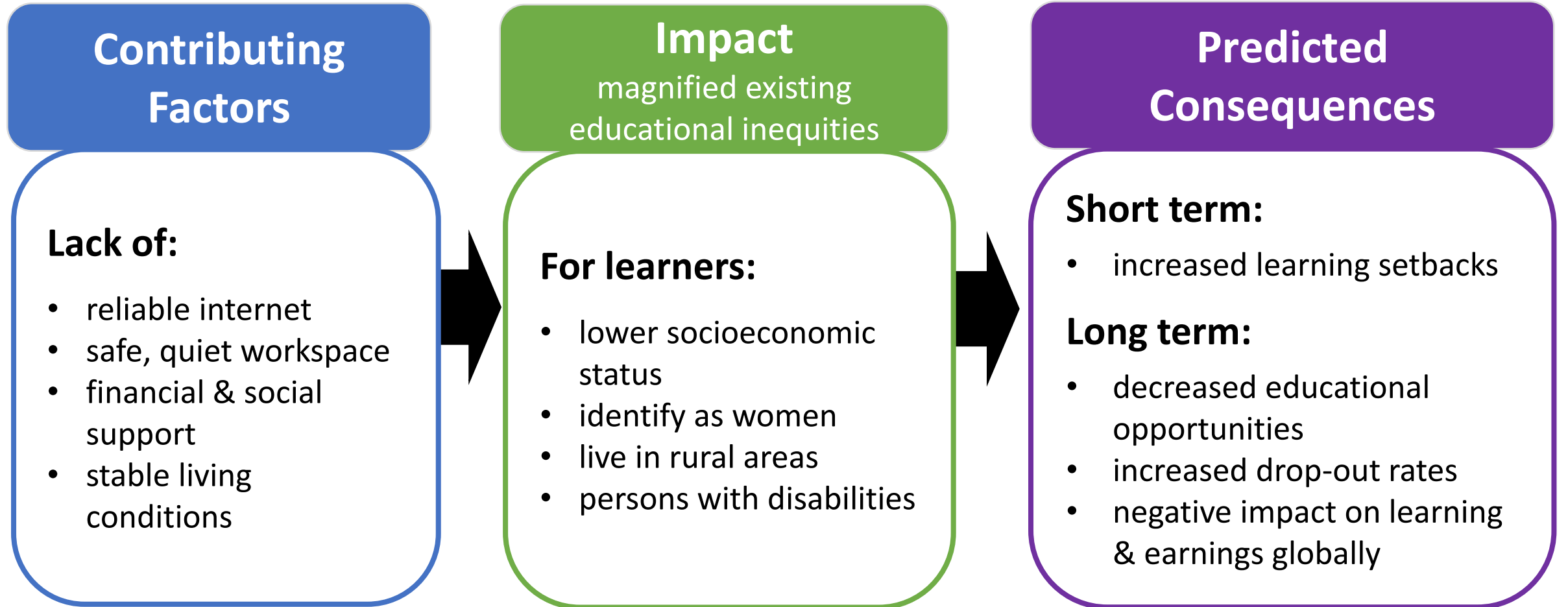
4

Apply the first framework component

5

XR Tool Selection: A Practical Guide for Instructors

1 The Impact of Covid-19 pandemic on Education

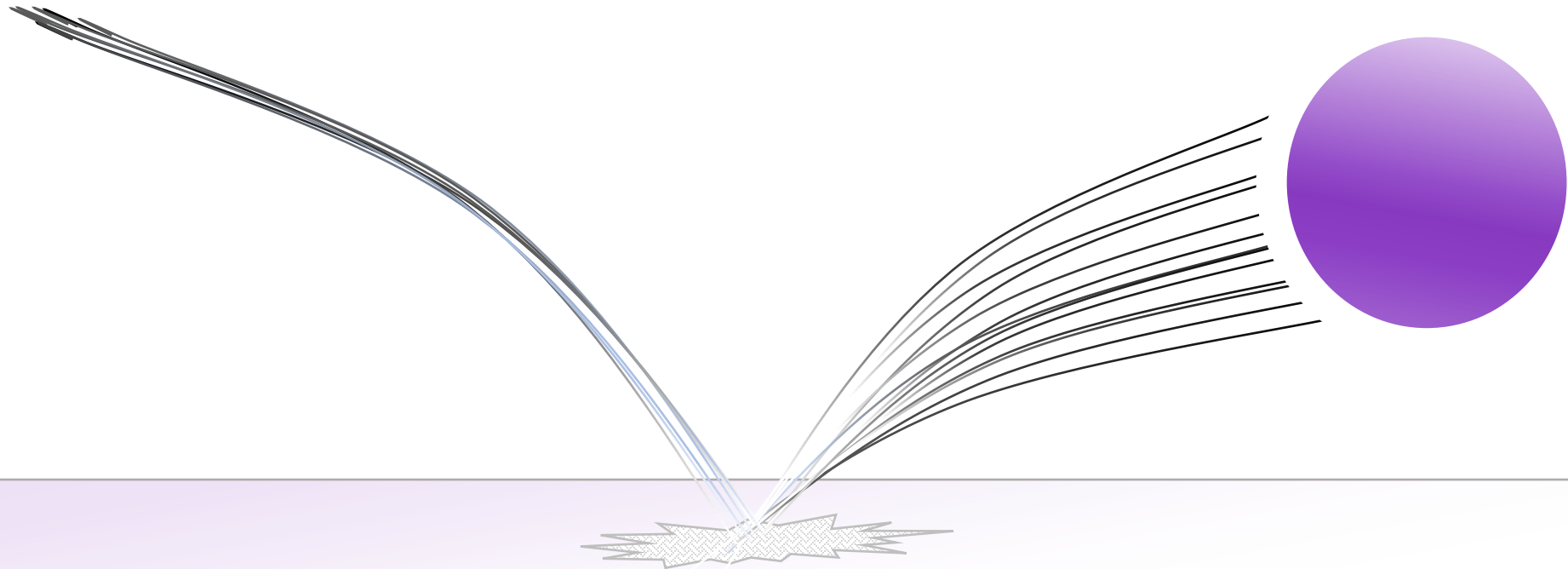


The Impact on Expectations



Contact North (2020)

Our response should be to address inequities in ways that facilitate ...



”not just bouncing back to pre-COVID-19 normality but bouncing-forward to a more resilient and just society”.

2

The Impact of Covid-19 pandemic on XR

Decreased opportunities for:

- hands-on learning
- labs
- workplace learning
- field trips
- international learning

**Covid
Lockdown**

**Remote
Learning**

Instructors chose XR for:

- interactive, experiential learning
- facilitating skill development
- creating a sense of community
- promoting engagement

Led to increased:

- student performance and engagement in remote learning
- understanding of abstract and complex content
- sense of place and community

**XR
done
well**

**XR
done
poorly**

Due to:

- poor preparation
 - poor support
 - poorly chosen technologies
- negatively impacted student performance

UN, UNESCO Recommendations

**To
minimize
the
negative
impact
on
learners:**

Technologies & activities

- Prioritize accessibility
- Use learning technologies supplementally
- Select technologies that can be accessed:
 - on multiple platforms
 - via mobile or web
 - without specialized equipment
- Provide personalized support
- Engage in regular assessment and adjustment to meet learners' needs

Educational initiatives & programs

- Address learning losses & prevent dropouts
- Consider blended learning
- Develop digital competence
- Promote flexibility
- Provide vulnerable students with support

3

Three pandemic studies:

8 Questions relevant to instructor decision-making



- Is the tool low cost or free?
- Is the tool simple to use?
- Can both instructors & students author content?
- Is the tool and content compatible with mobile phones, tablets and personal computers?
- Does the tool facilitate collaboration?
- Does the tool require a continuous internet connection?
- Can content created be shared/reused/remixed?
- Is support available?

S tudents
E ase of use
C ost
T eaching functions
I nteraction
O rganizational issues
N etworking
S ecurity and privacy

3

Developing Best Practices:

Consideration

UN &
UNESCO
Reports

8 Instructor
Questions

Bates' (2005)
SECTIONS
model

Mayer's
Principles for
Multimedia
Learning

Other
pandemic-
era research
and reports



Choosing

Using

Designing

Three-part framework to guide the creation and use of equitable XR learning resources

3

Developing Best Practices:

Choosing

Using

Designing

Three-part framework to guide the creation and use of equitable XR learning resources

Choose technology/activities:

1. **Pedagogical Design:** designed based on pedagogical principles; aligned with current educational research; enables achievement of learning outcomes
2. **Costs:** Keep costs to a minimum using free technology when possible
3. **Accessibility:** Accessible technology: laptops, cell phones, tablets, accessible to users with diverse abilities, used to supplement not replace other forms of learning
4. **Connectivity:** Do not require large downloads & if possible, can be used offline
5. **Level of Immersion:** Select less immersive XR technologies when they can fulfill learning outcomes
6. **Ease of Use:** Reliable, easy to use, and have strong technical support
7. **Repetition:** facilitates repetition
8. **Monitor Effectiveness:** Allows regular monitoring and evaluation of learning outcomes achievement



[ARTutor 3](#)

Develop PDF AR books



[Metaverse Studio](#)

Build, publish, share AR stories, games, & polls



[ARientation](#)

Create AR experiences using playing card markers



[Thyng](#)

Create & photo/video AR experiences



[CoSpaces](#) (VR & AR)

Build 3D scenes from object library, import 3D objects, animate, add interactivity



[Thinglink Education](#)

Create interactive 360 tours with text, audio, photo, video, web-links



[Marzipano](#)

Create and view 360 tours with interactive “hotspots”



[A-Frame](#)

Build VR experiences, games, applications incorporating 3D objects & complex effects

AR

VR

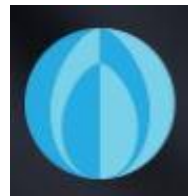
5 XR Tool Selection: A Practical Guide for Instructors

Part 1: Tool Guide

AR:



VR:



- Description
- How it works
- Preparation
- How learning can happen
- Potential pitfalls

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Part 2: Tool Comparison

AR:











VR:







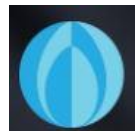



- Description
- Open Source
- Categories
- Paid add-ons
- Prerequisite skills
- Authoring platform
- User Platform
- Special Accessibility features
- Peer reviewed research
- Support available
- Suggested student age

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Part 3: Tool Selection Based on Intended Student group	AR				VR			
								
independent or distance learners	✓							
middle elementary students	✓	✓		✓	✓		✓	
upper elementary students	✓	✓	✓	✓	✓	✓	✓	
secondary students	✓	✓	✓	✓	✓	✓	✓	✓
post-secondary students	✓		✓	✓		✓	✓	✓
classroom or institutional use with role management		✓			✓	✓		
classroom or institutional use without role management	✓		✓	✓			✓	✓

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Part 4: XR Tool Selection Based on Intended Purpose	AR				VR			
								
augmenting PDF documents	✓							
creating 360° virtual tours		✓			✓	✓		
creating both AR & VR experiences					✓			
game-based learning		✓	✓		✓			
collaborative student projects		✓	✓		✓	✓		
development of coding skills		✓			✓			✓
displaying student work			✓		✓			
location-based treasure hunts/ tours		✓						
exploring real-life locations		✓				✓		
storytelling		✓			✓	✓		

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Part 5: XR Tool Selection Based on Tool Characteristic	AR				VR			
								
designed with educators in mind	✓	✓	✓		✓	✓		
designed with the apparent intention of remaining free	✓		✓					
that is open source							✓	✓
with haptic and voice commands	✓							
with multi-language functionality						✓		

Conclusions



Next Steps



Questions



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