TECHNICAL REPORT

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Information technology for learning, education and training — Human factor guidelines for virtual reality content —

Part 1: Considerations when using VR content

Technologies de l'information pour l'apprentissage, l'éducation et la formation — Lignes directrices relatives aux facteurs humains pour les contenus en réalité virtuelle —

Partie 1: Éléments à prendre en compte lors de l'utilisation de contenus en réalité virtuelle



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Foreword

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This document was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 36, *Information technology for learning, education and training*.

A list of all parts in the ISO/IEC 23842 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

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Introduction

Virtual reality (VR) technology is expected to be introduced into the world of primary and secondary education in the next two to three years.[1] However, there are some concerns, such as health-related side effects for learners who use VR technology in their development period. These issues can be raised in any environment that uses VR content.

Concerns related to health conditions:

— Discomfort: When using VR, some people experience symptoms of discomfort, such as dizziness, headache and nausea. These symptoms are called various terms such as 'VR sickness', 'simulator sickness', 'motion sickness' and 'cyber nuisance'. When actual physical movement does not occur with respect to the visual stimulus generated in the virtual environment, discomfort can be caused.

— Eyesight problems: Many devices are located very close to the user's eyes. As a result, some people feel visual fatigue after wearing them for a long time, and some users experience blurred vision, diplopia and mechanical near-sightedness.

— Photosensitivity Syndrome: Also known as Pokemon Shock or Nintendo Syndrome, this is a condition in which seizures (epilepsy) occur due to rapid flashing light stimuli.

— Musculoskeletal disorders due to repetitive tasks: If someone repeatedly takes the same posture for a long period of time to operate the machine, pain or fatigue can be caused by continuous stimulation of the musculoskeletal system.

— Hygiene problems: If many people use the same device jointly, or even if one person uses the same device repeatedly, problems such as infectious disease or skin irritation can occur.

Concerns related to safety:

— Limitations of the user’s field of view: When using a device that blocks physical surroundings from view, a user may not be able to remain aware of their physical surroundings which can lead to accidents such as collisions, falling, etc. Even if someone uses a see-through or semi-transparent device that overlaps a virtual object with reality, such distraction physical surroundings could increase the risk of having an accident, such as falling.

— Safety accidents caused by confusing reality with the virtual world: Accidents can occur in scenarios such as users trying to sit or lean against a virtual world chair or wall that does not exist in real life.

Concerns related to social aspects:

— If users cannot distinguish between the real world and the virtual world by excessive immersion into virtual reality, they may attempt to restart a real-life situation as if they were able to simply push the ‘reset button’ in VR.

Annex A provides examples of guidelines for users.

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Information technology for learning, education and training — Human factor guidelines for virtual reality content —

Part 1: Considerations when using VR content

1 Scope

This document presents considerations for using VR content in the learning, education and training (LET) domain for reducing reality and virtual reality crossover confusion among users and assisting users to effectively use these emerging technologies.

This document addresses VR content that uses a head-mounted display (HMD) in the LET domain. It does not address VR content using immersive technology and does not address augmented reality, mixed or merged reality content.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at http://www.electropedia.org/

3.1
virtual reality
VR
virtual reality has a high level of immersiveness, fidelity of information representation, and degree of active learner participation compared to other forms of mixed reality

[SOURCE: ISO/IEC TR 18121:2015, 3.6]

3.2
mixed reality
display continuum in which both real and virtual images are combined in some way and in some proportion

Note 1 to entry: Augmented reality (AR) and virtual reality (VR) are considered to be on the mixed reality continuum.

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