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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

ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) form the specialized system for worldwide standardization. National bodies that are members of ISO or IEC participate in the development of International Standards through technical committees established by the respective organization to deal with particular fields of technical activity. ISO and IEC technical committees collaborate in fields of mutual interest. Other international organizations, governmental and non-governmental, in liaison with ISO and IEC, also take part in the work.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of document should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see [www.iso.org/directives](http://www.iso.org/directives)).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO and IEC shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see [www.iso.org/patents](http://www.iso.org/patents)) or the IEC list of patent declarations received (see <http://patents.iec.ch>).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see [www.iso.org/iso/foreword.html](http://www.iso.org/iso/foreword.html).

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](http://www.iso.org/members.html).

## 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.<sup>[4]</sup> 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.



# 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.