

# UMARG

Using Mobile Augmented Reality Games to develop key competencies through learning about sustainable development

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## Module 1:

How to design, develop and incorporate Mobile Augmented Reality Games in teachers' activities to increase students' digital and civic key competencies (part 1)

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# Module contents

- Introduction to key competences framework for lifelong learning
- Digital competences and sub-skills
- Civic competences and sub-skills
- Key competences and sustainable development education
  
- What is Augmented Reality?
- Types of Augmented Reality
- Augmented Reality devices
- Mobile Augmented Reality Games (MARG)



# Introduction to key competences framework for lifelong learning

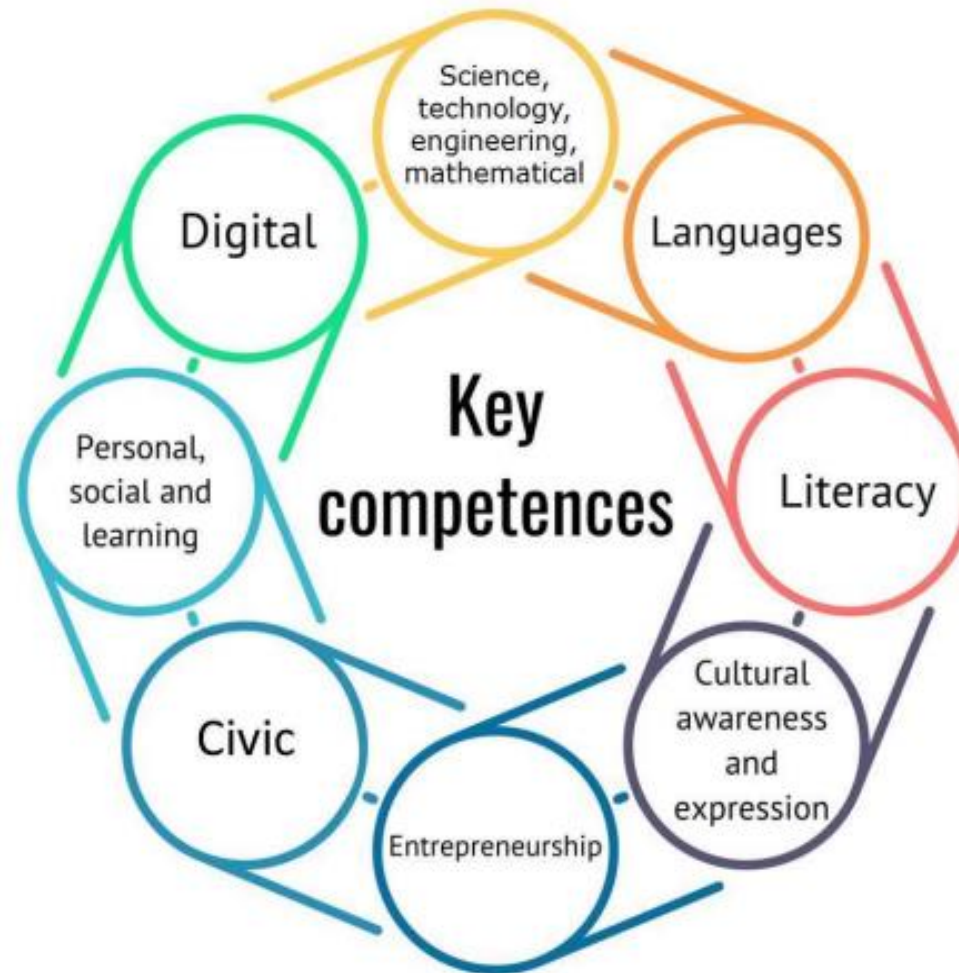


Key competences



Key competences are a dynamic combination of the **knowledge**, **skills** and **attitudes** a learner needs to develop throughout life, starting from early age onwards.

# Introduction to key competences framework for lifelong learning



Council of the European Union Recommendation on key competences for lifelong learning

# Digital competences and sub-skills



# Digital competences and sub-skills

- ✓ **Knowledge** : Individuals should understand how digital technologies can support communication, creativity and innovation, and be aware of their opportunities, limitations, effects and risks. They should understand the general principles, mechanisms and logic underlying evolving digital technologies and know the basic function and use of different devices, software, and networks.
- ✓ **Skills**: Individuals should be able to use digital technologies to support their active citizenship and social inclusion, collaboration with others, and creativity towards personal, social or commercial goals. Skills include the ability to use, access, filter, evaluate, create, program and share digital content.
- ✓ **Attitudes**: Engagement with digital technologies and content requires a reflective and critical, yet curious, openminded and forward-looking attitude to their evolution. It also requires an ethical, safe and responsible approach to the use of these tools.



# Civic competences and sub-skills

**Respect for differences**

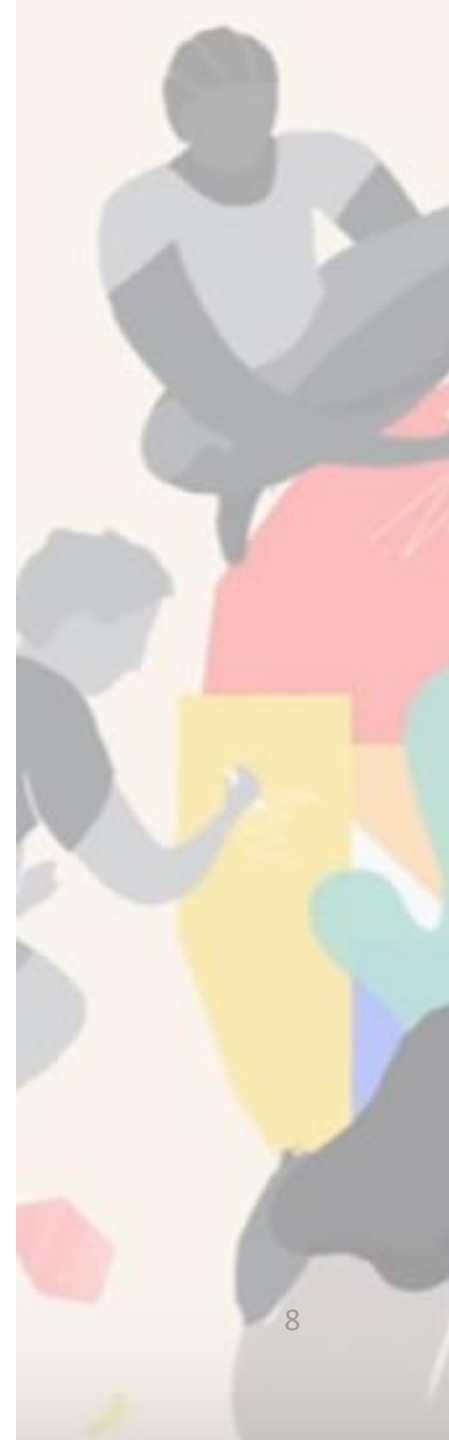
**Active citizenship**

**Critical thinking**



# Civic competences and sub-skills

- ✓ **Knowledge** : Citizenship competence is based on knowledge of basic concepts and phenomena relating to individuals, groups, work organizations, society, economy and culture. This involves knowledge of contemporary events, as well as a critical understanding of the main developments in national, European and world history.
- ✓ **Skills**: Skills for citizenship competence relate to the ability to engage effectively with others in common or public interest, including the sustainable development of society. This involves critical thinking and integrated problem-solving skills, as well as skills to develop arguments and constructive participation in community activities, as well as in decision-making at all levels, from local and national to the European and international level.
- ✓ **Attitudes**: Respect for human rights as a basis for democracy lays the foundations for a responsible and constructive attitude. Constructive participation involves willingness to participate in democratic decision making at all levels and civic activities. It includes support for social and cultural diversity, gender equality and social cohesion, sustainable lifestyles, promotion of culture of peace and non-violence, a readiness to respect the privacy of others, and to take responsibility for the environment.





# Key competences in Education for Sustainable Development



# Key competences in Education for Sustainable Development

**increasing complexity and uncertainty**

**more individualization and social diversity**

**vulnerability and exposure to natural and technological hazards**

**expanding economic and cultural uniformity**

# Key competences in Education for Sustainable Development



According to UNESCO (2018):

- ✓ critical thinking,
- ✓ problem solving,
- ✓ collaboration,
- ✓ active citizenship,
- ✓ self-awareness and
- ✓ critical use of all forms of media are core sustainability skills that cut through several key competences (as described by the EU Key Competences Framework) and are essential to future citizens.



# What is Augmented Reality?

# Augmented Reality Definitions

The term “augmented reality” (AR) has been defined differently among researchers in computer sciences and educational technology due to the different ways and media the technology can be experienced.

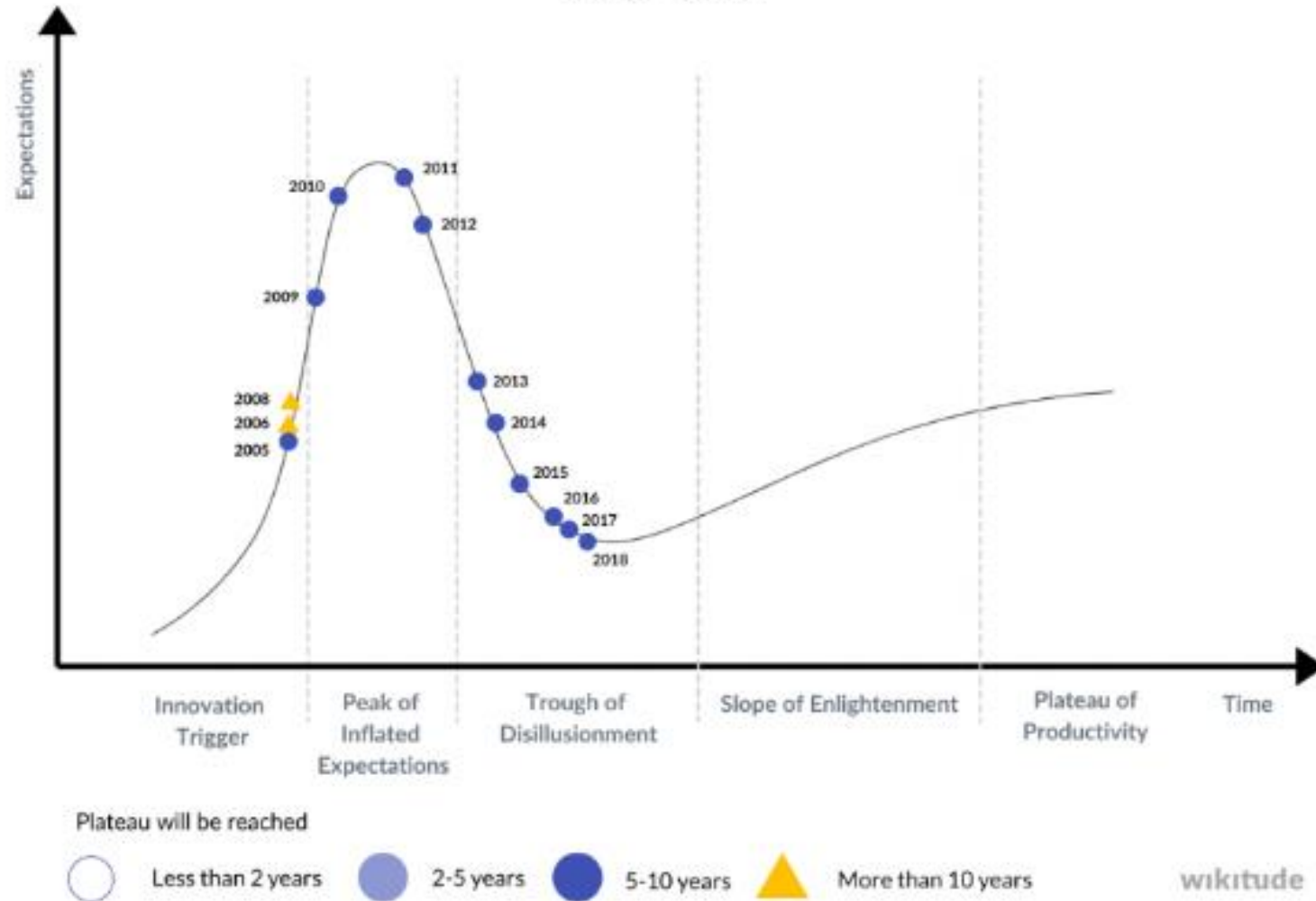
- Azuma (1997) defines AR as a system that has three main features: (a) it combines real and virtual objects; (b) it provides opportunities for real-time interaction; and (c) it provides accurate registration of three-dimensional virtual and real objects.
- Carmigniani and Furht (2011), define AR as an indirect or real-time view of a physical real-world environment that has been augmented by adding virtual information to it.

# Augmented Reality's Journey in the Cycle

Data by Gartner Inc. - Graphic by Wikitude



## Augmented Reality Evolution - Gartner Hype Cycle 2005 -2018



Augmented reality evolution in the Gartner Hype Cycle from 2005 until 2020. Produced by Wikitude.

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# Augmented Reality in education

## Learning outcomes

- Enhancing learning achievement
- Enhancing learning motivation
- Helps students to understand
- Provide positive attitude
- Enhancing satisfaction
- Decreases cognitive load
- Enhancing confidence
- Enhances spatial ability
- Pedagogical



# Augmented Reality in education

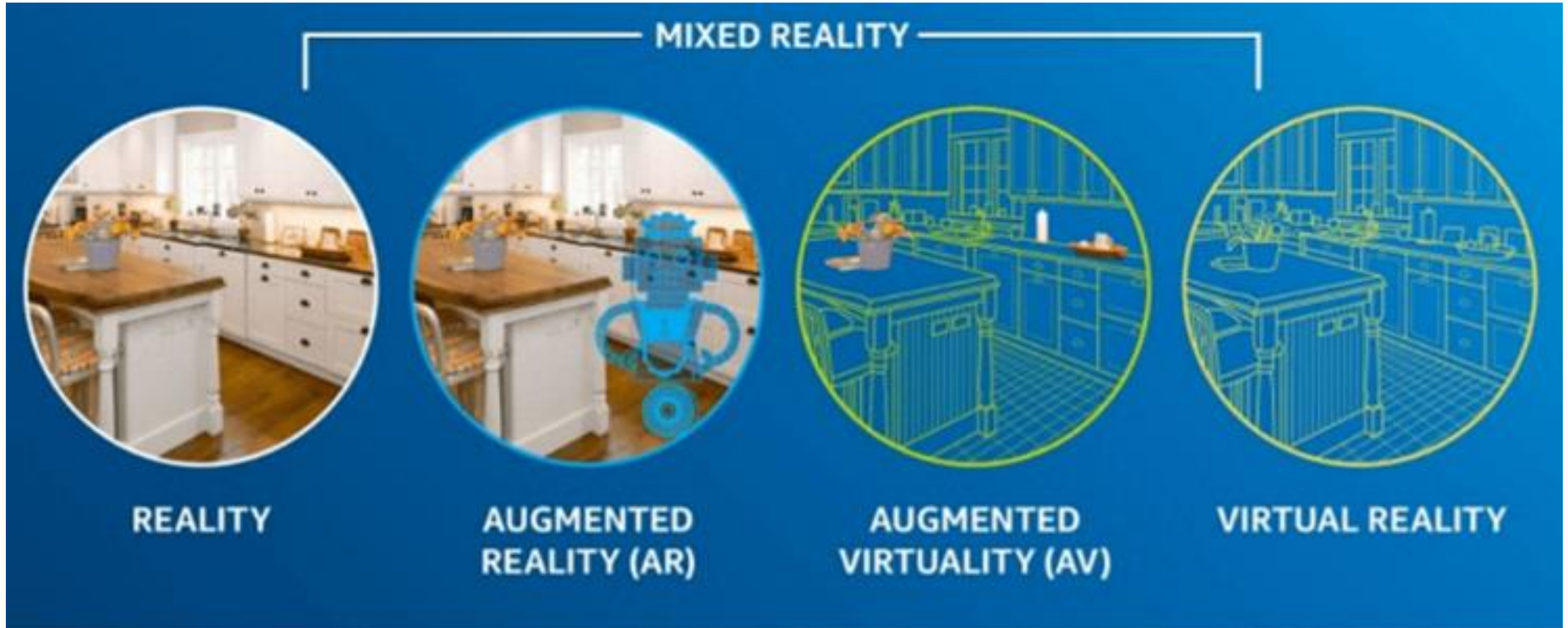
## Pedagogical contributions

- Increases interest
- Provides collaboration opportunities for students
- Facilitates communication between students and lecturer
- Promotes self-learning
- Enables multi-sensory learning
- Enables learners to quickly receive information





# Augmented Reality in the Mixed Reality Continuum



# Available technologies for AR experience



# Types of Augmented Reality

**Image based AR**

**Location based AR**

## Types of Augmented Reality

### Image based AR



With marker

Image based augmented reality **with markers** requires specific tags, such as Quick Response Codes, to record the position of three-dimensional (3D) objects in the real-world image.

## Types of Augmented Reality

# Image based AR

In image based augmented reality **without markers**, any part of the real environment can be used as a "target" to project the virtual object in space.



Without marker image

Go to [www.menti.com](http://www.menti.com) and use the code 3082 8668

## Suggest a way you can use image based AR with your students/trainees

 Mentimeter



# Types of Augmented Reality

## Location based AR

Location based augmented reality uses data from wireless internet or the Global Positioning System (GPS), and the device's gyroscope, accelerometer to determine the location to be augmented with virtual content.



# What are **M**obile **A**ugmented **R**eality **G**ames (MARG)?



Mobile Augmented Reality Games are games played in the real world with the support of digital devices (PDAs, smartphones) that create a fictional layer on top of the real-world context.

These games use data from a wireless network and/or GPS to determine the location of the device in the area and to augment the real environment with digital objects (e.g., images, audio, video, 3D, etc.)

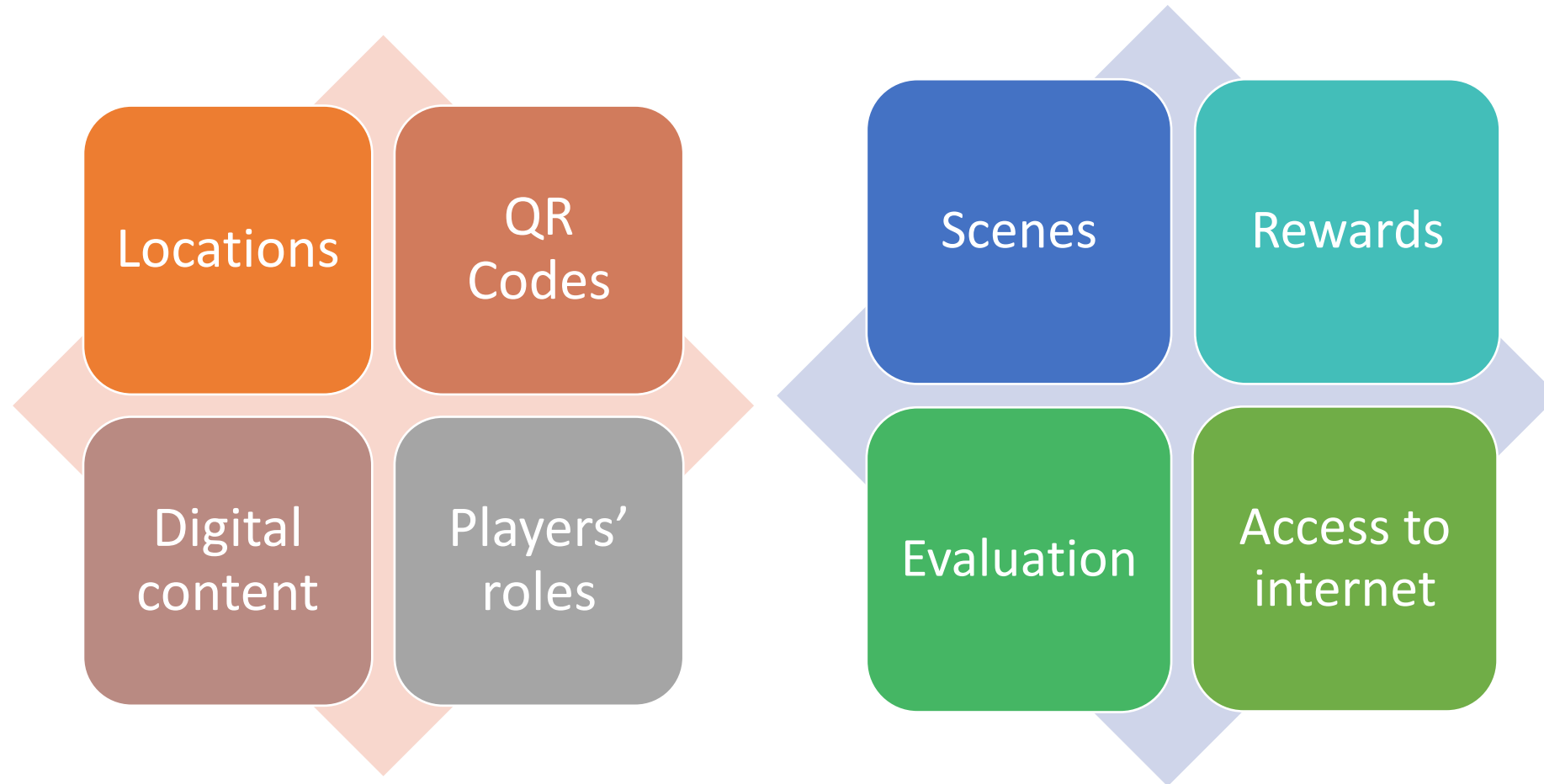


# Advantages of MARG



- ✓ They are usually played outside classroom
- ✓ They provide in-situ and inquiring based learning experiences
- ✓ They combine physical and digital information
- ✓ They provide collaboration between players
- ✓ They foster the development of competences

# Affordances of MARG



**Thank you for your attention**

[www.umarg.eu](http://www.umarg.eu)

