GreekCHI Symposium

SUPPORTING INCLUSIVE DESIGN THROUGH VR TECHNOLOGIES: THE VR4ALL PROJECT

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VR4All

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VR4ALL PROJECT

Erasmus+

https://vr4all.eu/

Partners

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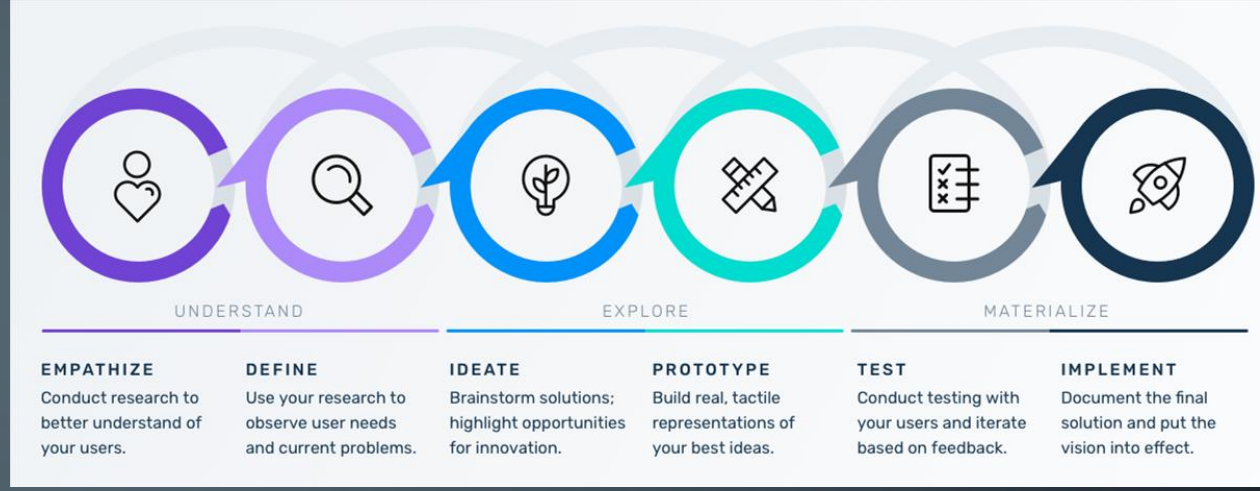
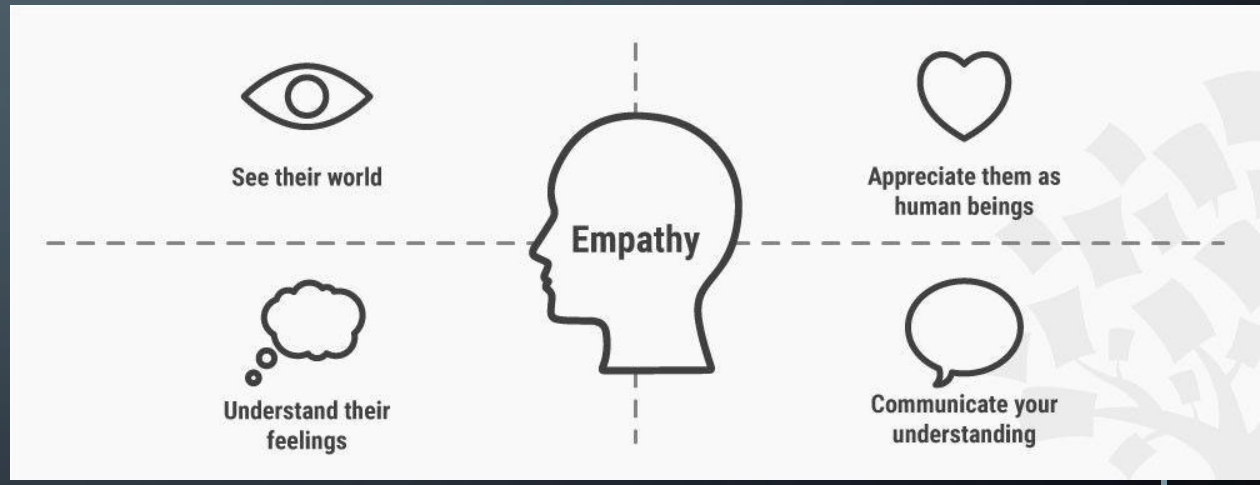
PROBLEM STATEMENT

- Empathy: first and foundational step in the design thinking methodology.
- Empathy: ability to understand what the users perceive and experience.
- In the design thinking process, the empathize phase aims at gaining insight into the users, their needs, constraints and motivations.





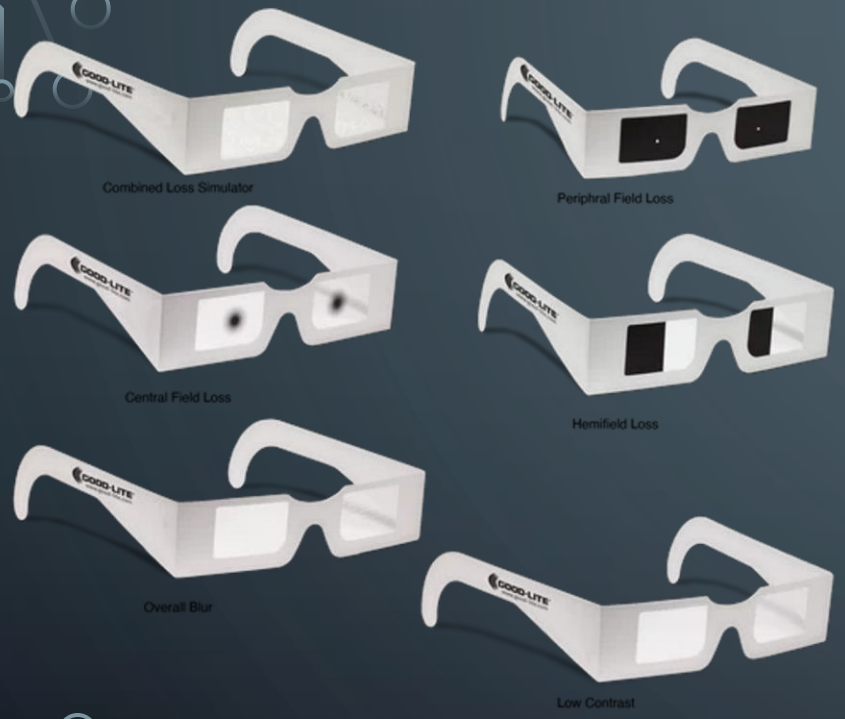
PROBLEM STATEMENT: EMPATHETIC DESIGN

- Empathy enables designers to see with the eyes of another.
- Empathize methods include experts' consultation, qualitative and quantitative user research methods, photo and video user-based studies, field observation, creation of empathy maps, etc.
- The most effective way for a designer to gain empathy comes in the form of immersion: first-hand experience what it feels like to be the end-user.

PROBLEM STATEMENT: INCLUSIVE DESIGN (DESIGN-FOR-ALL)

- Crucial requirement for design: make the product accessible, usable and inclusive.
- Design-for-all refers to the design of products or environments to be accessible to all people, regardless of age, disability or other factors.
- Empathizing with disabled users is far more challenging for prof designers. Why?
  - Designers often lack lived experience which would allow them to easily empathize with those target groups.

VISUAL IMPAIRMENT SIMULATORS



VR4ALL – THE KEY IDEA

- Virtual Reality (VR) represents an effective tool for simulating experiences.
- Immersive VR may be viewed an empathy tool.
  - Immersive VR may be used to simulate disabilities with a high degree of ‘ecological validity’.
- Disability simulations can be implemented as virtual environments (VEs) featuring an avatar (resembling a disabled person) that the user can embody.
- Participants without disabilities are put in situations designed to briefly mirror the lives of those with disabilities as realistic as possible.
- Recent studies have shown that users elicit greater empathy for the disabled if they have previously embodied an avatar with a disability in VR.

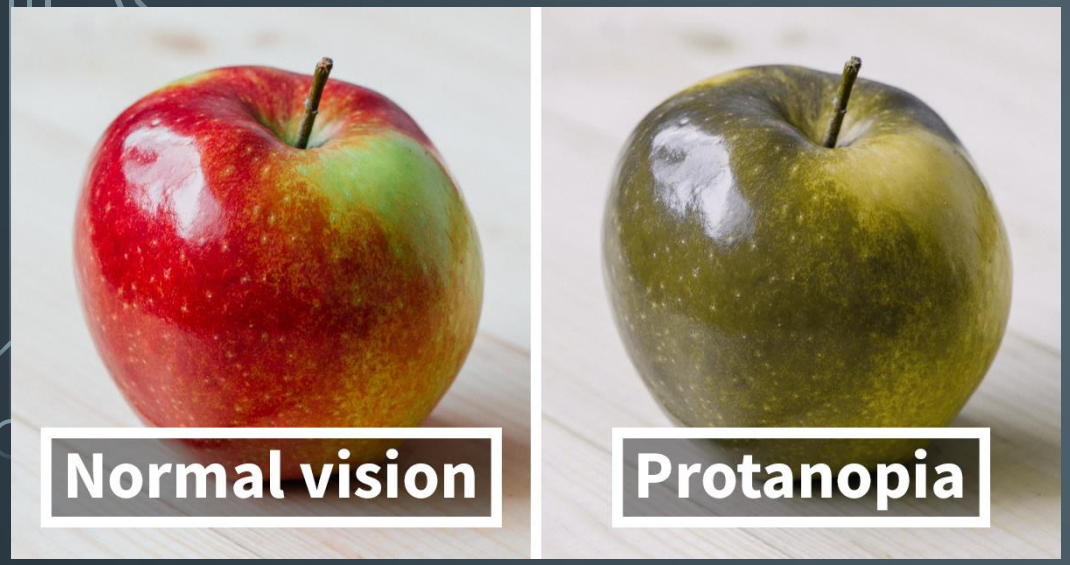
➢ **The use of VR simulations as a means to empathizing users in the design process has NOT been investigated so far, particularly in the context of design-for-all.**

- Simulation of Different Perspectives
- Social Justice Advocacy
- Role Reversal Simulations
- Environmental Awareness

"EMPATHY IS BUILT ON SHARED EXPERIENCE – IT'S FEELING WITH PEOPLE."

VR4ALL: OBJECTIVES

- Generic objective use of immersive VR in the preliminary phases of the design thinking process.
- Deliver VEs to enable designers designing more accessible products.
- This objective will be addressed through simulating a variety of disabilities:
  - Visual impairments: color blindness, long- or short-sightedness, visual field loss, glaucoma, age-related cataract, etc
  - Motor impairments: wheelchair users, Loss or damage of upper limbs, Parkinson's Disease, etc


Normal vision
Protanopia

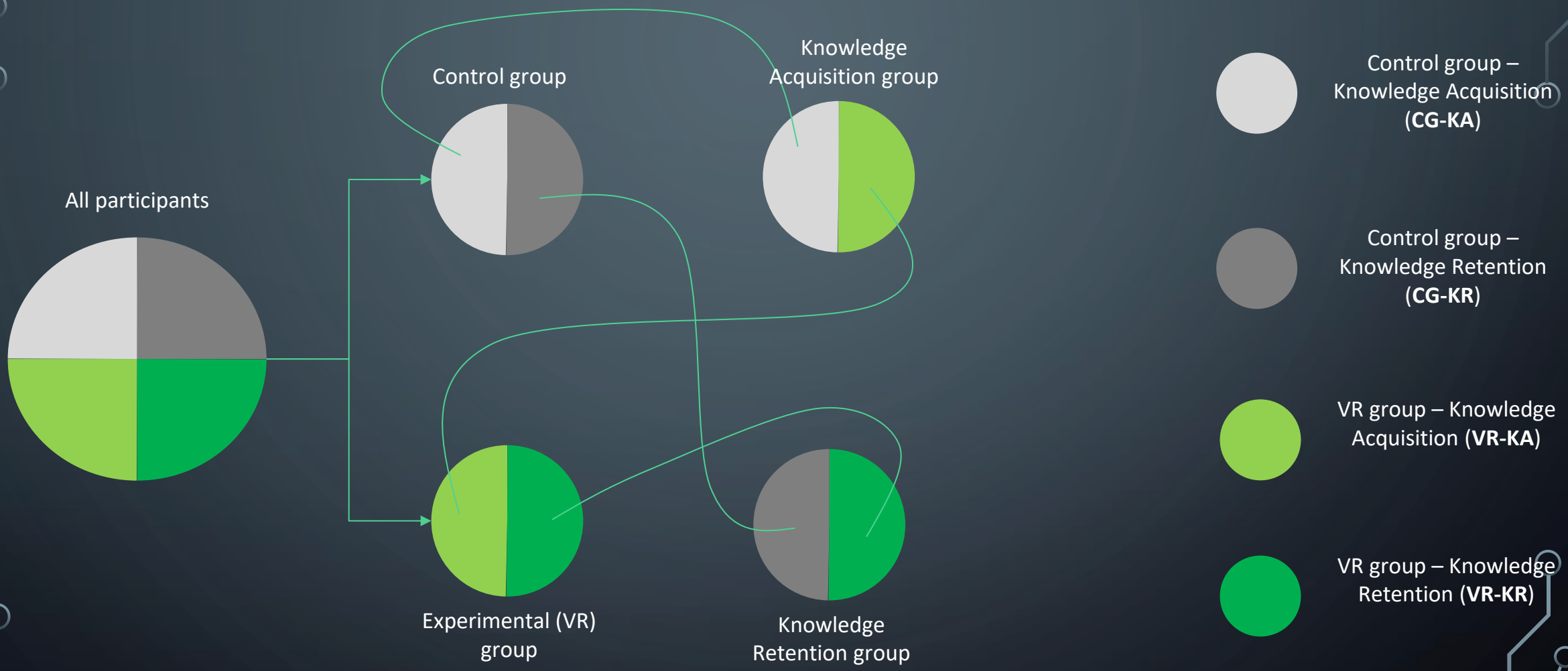
RESEARCH METHODOLOGY: TECHNICAL PART

1. Specifications and requirements for typical simulated disabilities
2. Programming of VR assets (‘disability filters’): Unity3D plugins used in VR applications to enable the realistic simulation of the disabled people perspective, e.g., control interfaces for virtual wheelchairs, camera filters simulating color vision deficiency, etc.
3. Definition of use cases for simulated scenarios
   - Formally define a number of 3D environments where the users will be immersed in
   - Script a number of scenarios for tasks assigned to users in those 3D environments
4. Integrated VR applications: applications that incorporate the 3D models and VR assets and may be executed on end-user devices;

RESEARCH METHODOLOGY: PILOTS

1. Recruit 80+ product design students
2. Separate them in different groups:
   - A control group will go through traditional training on design-for-all principles
   - An experimental group that uses our VR tool in immersive environment
3. After the training session we ask all users to pursue a design project, to test their knowledge in inclusive design
   - Assess knowledge acquisition vs knowledge retention
4. Ask accessibility experts to assess the final design proposals wrt accessibility

EXPERIMENTAL PROTOCOL: PARTICIPANTS SUBGROUPS

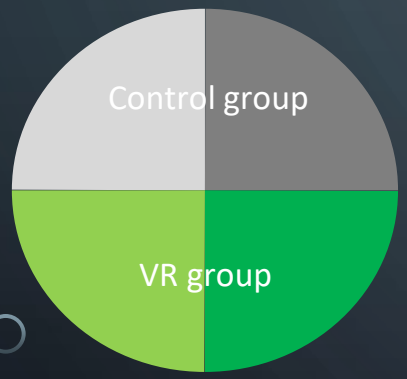


- To yield statistically valid results, we need **≥ 20 participants per subgroup**
- **Target**: recruit ~100 participants to allow non-shows or any other unexpected incident

EXPERIMENTAL PROTOCOL PHASES: LET'S PUT IT ALL TOGETHER

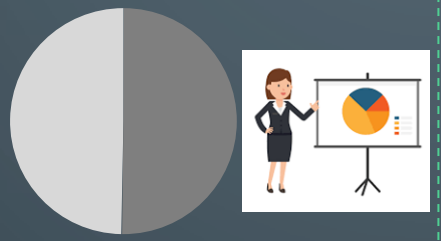
Education session: intro to design-for-all concepts

All participants



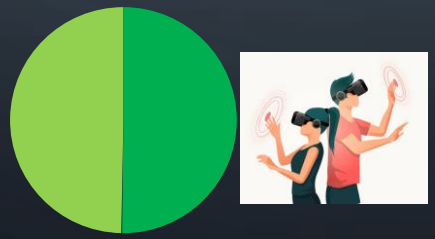
Day #1

Education session: disabilities effects



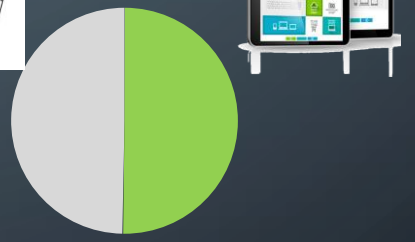
Conventional education

VR-enhanced education



Days #2-4

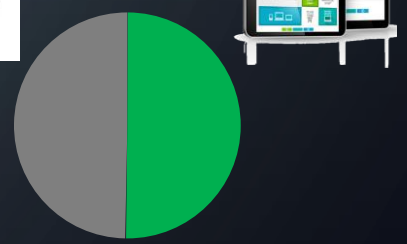
Learning outcomes assessment: knowledge acquisition



Design assignment

Day #5

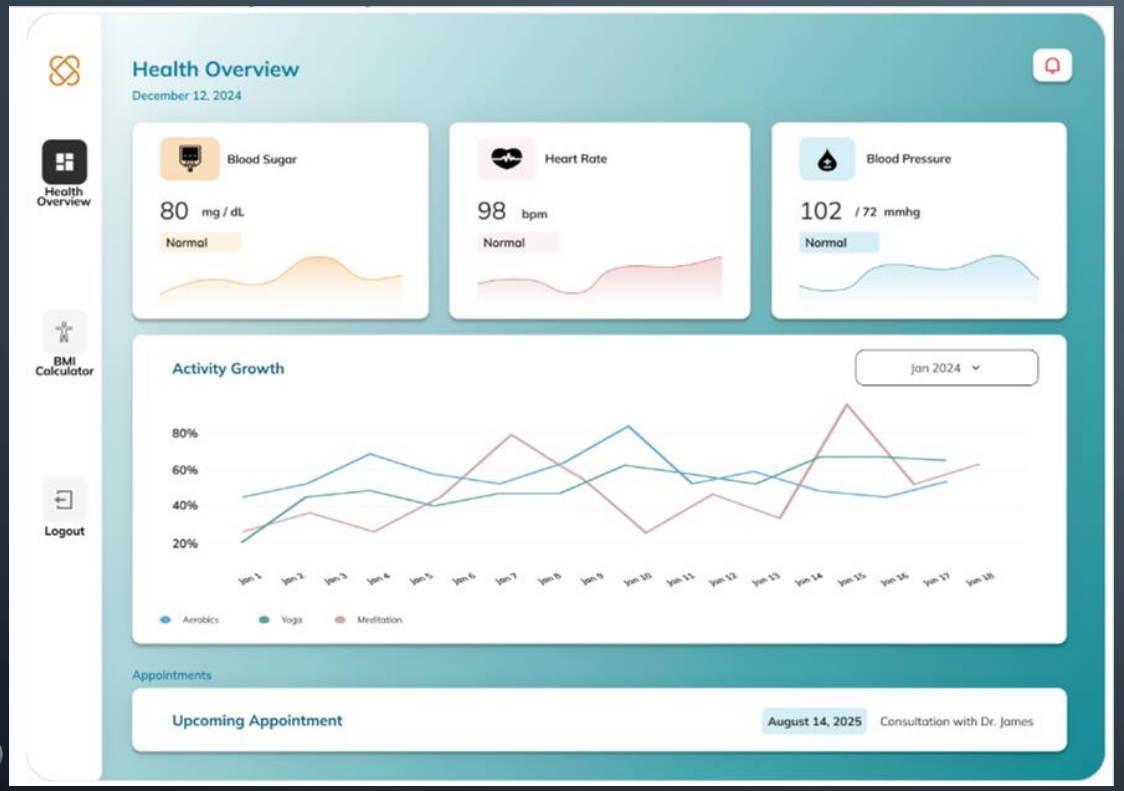
Learning outcomes assessment: knowledge retention



Design assignment

Day #5 + 1 month

DIGITAL VS. PHYSICAL PRODUCT DESIGN PROJECTS

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ngiyabonga
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спасибо
dank je
thank you
gracias
tapadh leat
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mauruuru
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mochchakkeram
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