Building Bridges: A Collaborative Pipeline for Educational Game Creation

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Why this matters

Educational games can make STEM learning interactive, collaborative, and connected to practical challenges. However, developing games that are both pedagogically meaningful and feasible in everyday classrooms remains difficult. Limited lesson time, heterogeneous devices, technical constraints, and explicit learning outcomes must be reconciled with creative game design (Arnab et al., 2015).

DIETER at a Glance

- Modular Educational Escape Room
- Short, tablet-ready STEM mini-games
- Designed for upper secondary classrooms

Our approach

DIETER (**DI**gital **E**duca**T**ional **E**scape **R**oom) uses a participatory pipeline that connects subject-matter experts, game designers, students, and educators to co-create modular, tablet-ready Educational Escape Room mini-games for upper secondary education.

- **Phase 1 – Explore & Co-design:** A student survey and workshop captured the target group's preferences and needs. Game designers and subject-matter experts translated these insights and relevant curriculum topics into initial game concepts.
- **Phase 2 – Prototype:** Game design students transformed concepts into playable prototypes, either developing their own ideas or building on concepts created in Phase 1.
- **Phase 3 – Refine & Validate:** Game designers further develop the prototypes, while subject-matter experts and didactic experts review content accuracy and learning design. Feedback from teachers and students informs further refinement and classroom validation.

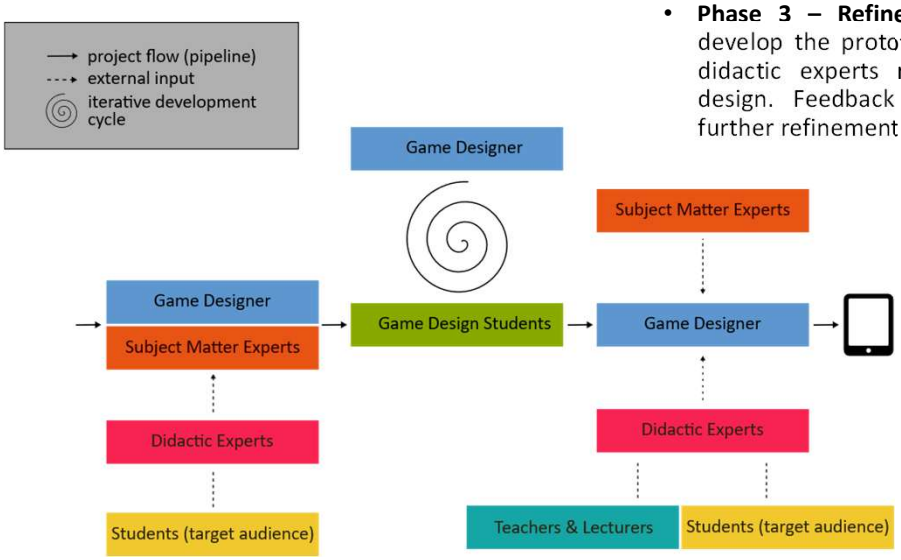


Figure 1: Three-phase participatory pipeline for co-designing, developing, and validating DIETER mini-games.

Current Status

- Target-group analysis and co-design workshops completed
- Initial mini-game concepts translated into structured design briefs
- First modular prototypes developed by game design students
- Initial expert reviews of content accuracy, learning design, and classroom feasibility completed

Next Steps

- Evaluate the mini-games in classroom settings
- Strengthen scaffolding, debriefing, and teacher materials
- Assess how gameplay supports observable learning outcomes

Conclusion

The idea-generation process proved more time-consuming than expected, and early concepts frequently reproduced familiar game formats. The current iteration therefore excluded recurring concepts to encourage greater diversity and creativity. Further iterations are needed to assess the effectiveness of this intervention.

Effective implementation of the three-phase pipeline also depends on sustained communication and clear handovers between stakeholder groups. Continuity can be challenging when concept originators and developers cannot interact directly or when student developers are no longer available during Phase 3 to incorporate feedback.

References

Arnab, S. *et al.* (2015) 'Mapping learning and game mechanics for serious games analysis', *British Journal of Educational Technology*, 46(2), pp. 391–411. doi: 10.1111/bjet.12113

Funded by City of Vienna, Economic Affairs, Labour and Statistics

DIGITAL EDUCATIONAL ESCAPE ROOM