"H"i5: Unblocking the barriers to learning games in education

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Abstract: One of the greatest challenges discussed in the field of educational technology is the difficulty in the successful adoption and implementation of these innovations in practice in the general classroom. Many beautiful games get developed, but few are used broadly in education. Research has teased out the various barriers to effectively integrating technology in the classroom. There is an array of reasons behind this lack of adoption, however many occur at the school and classroom level and can often be effectively mitigated if awareness and support are brought to the potential challenges—this is the goal of the i^5. Game designers can use this framework to enhance their designs and marketing mechanisms to increase adoption, and educators can do the same to mitigate some of these barriers which can often thwart intentions to try new games and pedagogies in the classroom.

Overview

The i^5 is an analysis and survey tool that assists teachers, school leaders, and researchers in the successful use of educational innovations. The i^5 helps in identifying and mitigating the barriers to innovation—particularly technology-based innovations—at varying levels of the educational system—from the individual classroom up to macro/national level. The i^5 was derived from a metasynthesis on the barriers to the integration of technology in education (Groff & Mouza, 2008); from this metasynthesis a framework (see Figure 1) and the i^5 tool were produced, which subsequently has been used in numerous settings including regional teacher professional development and the design of educational innovations and supporting programs (Klopfer, Osterweil, Groff & Haas, 2009; Klopfer & Haas, in press). This framework gives a basic overview to the potential barriers across the different elements of the system with each of these boxes representing very nuanced elements such as school cultures. Using this framework in context with a specific game, we can identify likely barriers and challenges to adoption in schools and offer suggestions on ways to overcome or mitigate these barriers in order to increase the game's likelihood of adoption and scale. Those elements within the gray box inside Figure 1 are elements that can be influenced in this way (Groff & Mouza, 2008).

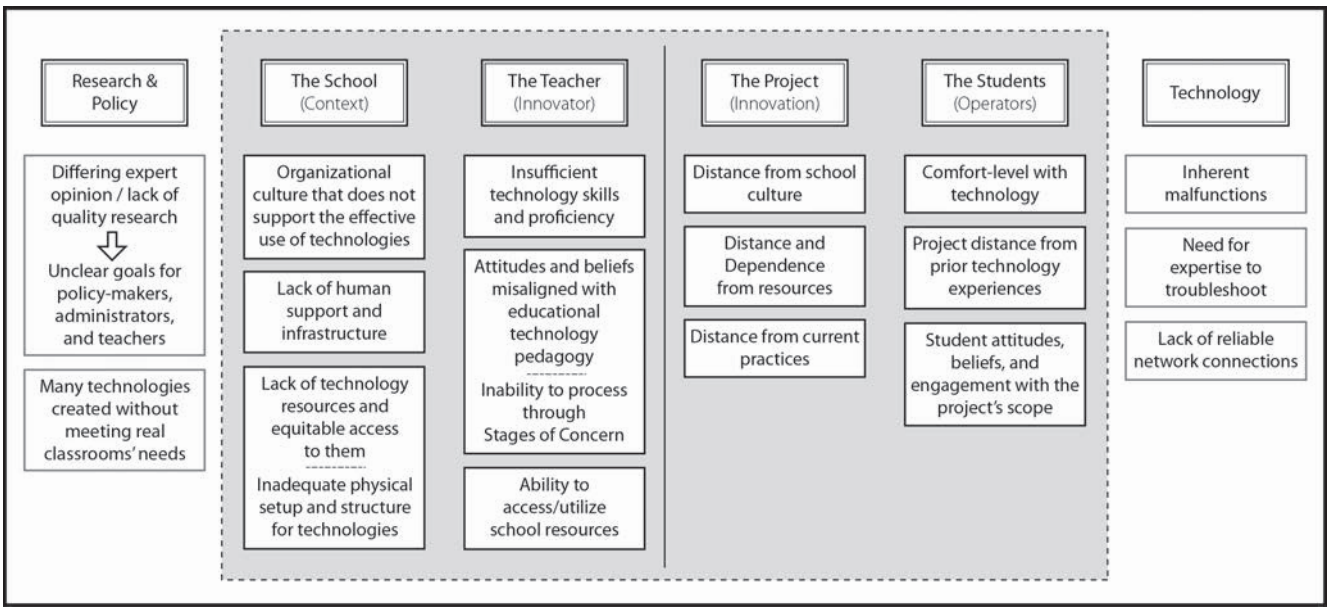

***Figure 1*: The barriers to integrating technology-based innovations in the classroom.**

Each learning game can address likely barriers to adoption when considering the game's design, but also post-production, by creating supports and mechanisms to reduce the barriers when teachers go to use the game (see Figure 2). The Learning Games Network has used the i^5 framework with various learning games developers—some of these examples will be fleshed out in the paper/poster.

The Innovation (Game)	The Context (Schools)	The Innovators (Teachers)	The Operators (Students)
Distance from School Culture – The extent to which the game deviates from general school culture and beliefs, and is dependent on more than just the teacher to succeed.	**Organizational Culture & Support –** The extent to which school culture is supportive of the use of this type of innovation, through leadership, peer support/collaboration, and other school mechanisms	**Technology Proficiency –** Individual teacher aptitude, proficiency and comfort level with technology and new tech-based applications.	**Technology Proficiency –** Individual student aptitude, proficiency and comfort level with technology and new tech-based applications.
Distance from Resources – The extent to which the game requires new hardware and technologies to implement, and the teacher needs to have control over this hardware.	**Human Infrastructure –** The capacity of schools in regards to responsive technical staff, supportive administrators and other human capital resources	**Pedagogy-Tech Proficiency –** Attitudes/ beliefs about learning via tech-based applications, and the degree of alignment of these with the pedagogy designed into the game.	**Project-style Experience –** The comfort level of the student with the role they must take during the implementation of the game (i.e. self-directed, collaborative, etc).
Distance from Current Practice – The extent to which the game/project is similar to previously implemented games/ projects and/or pedagogies for this content.	**Technology Infrastructure –** The school's tech capacity in terms of access technology to support the game (i.e. computer labs, classroom computers, laptops, tablets, etc).	**Knowledge of Resources** – Individual teacher resources and supports, both within and outside the school, that support the game.	**Beliefs/Attitudes –** The attitudinal factors that vary greatly amongst students and will impact their performance with the game in the classroom.

***Figure 2*: The potential barriers to address when using a learning game in the classroom.**

The i^5 in Practice

The i^5 has also been developed into an Online Survey for individual teachers who seek to try a new learning game in their teaching. The tool prompts a teacher to reflect on questions to these elements in regards to their context and the learning game they want to use. When finished, the tool feeds back a brief report to the teacher, helping them identify likely challenges they will face and suggestions on how to overcome them. Ultimately, this data can be aggregated to help a school and/or district leader understand the common challenges to using game-based learning in their school/district, and plan supports and interventions for those areas. Likewise, this data can be aggregated at a supra level, to inform game designers and developers on ways to create supports with their learning games to improve adoption and integration in the classroom. For example, the i^5 has been used by the Learning Games Network to provide a market analysis of potential barriers to adoption and classroom integration of learning game developed by an external partner whose game was targeting financial literacy. Through this analysis, the game developer was able to create strategic supports and on-ramping mechanisms to increase the use and adoption of games by teachers, students, parents, etc.

A sample use case of a teacher using the i^5 to support his personal classroom practice would be:

> *Mr. Smith has heard good things from colleagues who have used the game Civilization in their classrooms to teach the core unit of historical development and negotiation dynamics. He decides he wants to try this new approach this year in his classroom, but has little familiarity with games. A peer refers him to starting with the i^5 to help him in his endeavor. He takes the brief questionnaire the i^5 walks him through, and it identifies for him likely challenges he will run into; these include the Human Infrastructure in his school to support him in using this digital game, and Project-Style Experience of his students—as this will likely be a fairly new school experience for him. The i^5 also suggests some ways he can find supports and overcome these potential barriers: he lets his tech-savvy colleagues know that he's going to be implementing this game-based learning during a given week, and asks if they would be available during that time to answer questions and give support as needed; he also decides to do a mini experience that exposes his students to an immersive game-based*

learning experience first, so they are more familiar with it before jumping into the full unit with Civilization. After the unit is completed, Mr. Smith decides to take the i[5] survey again to review what actual barriers and challenges he did encounter when he implemented the unit, so he can keep improving on them in the meantime before his next game-based learning endeavor.

References

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