

A constructionist and participatory approach to game-based learning

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Book review: Kafai, Y. & Burke, Q. (2016). *Connected gaming: What making video games can teach us about learning and literacy*. Cambridge:MA, MIT Press)

For a long time, researchers have identified a clear relation between learning and playing digital games (Malone & Lepper, 1987). Indeed, games offer a learning culture which matches students' interests (Prensky, 2001). They propose challenging interactive experiences that foster intrinsic motivation (Gee, 2003, 2007) and learning by doing processes (Aldrich, 2005); they also offer meaningful learning experiences where students face real-world problems (Gee, 2003), and provide risk-free environments which allow for explorative practices (Crawford, 1984; Salen & Zimmerman, 2004). Now that games have gained a wide acceptance among the educational communities (Van Eck, 2006), new strategies are needed to integrate game-based learning in the digital world of the 21st Century, featured by social connectivity. The book reviewed hereby - *Connected gaming: What making video games can teach us about learning and literacy* - takes up the challenge.

Almost 15 years after Gee's landmark book, this title takes game-based learning one step further, by proposing *connected gaming* - an approach which engages students in making and sharing digital games. At the heart of the Do It Yourself (DIY) movement, the central thesis of the book relates to the educational benefits of such approach, i.e., coding, collaboration, and creativity. The authors, Yasmin B. Kafai (University of Pennsylvania) - the pioneer educational researcher on children's programming digital games - and Quinn Burke (College of Charleston), show an extensive expertise to sustain their argument, drawing on their own research, as well as a wide range of recent studies and developments.

The introduction provides a conceptual and contextual foundation to the book's argument. The authors describe a recent shift from playing to making games, triggered by the emergence of *modding* (player-made alterations in a game) and *metagaming* (activities conducted beyond the game, like online discussions) practices, as well as the rise of the maker and coder movements in the education sector. Kafai and Burke then blur the line between instructionist (playing games for learning academic content and skills, as spread by the serious games movement) and constructionist (where games are designed by learners) gaming approaches, in favor of a comprehensive stance which engages students in "learning to play and make games" (p. 5). In the lens of their previous work on computational participation (Kafai & Burke, 2014), the authors highlight the social aspect of playing and designing games. Through their argument, they propose an inclusive and accessible view of game-based learning, through which everyone can play, make and learn, in inside and outside of the school.

The book is structured into different chapters, each one examining connected gaming from a different side. The Serious Side is about the potential of game making for learning and literacy. The chapter first tracks down the origins of the constructionist approach, presenting the case of a ten-year-old student who learnt to code by designing her game using the *Logo* programming language. Drawing on a substantial body of research applied to formal and informal learning settings, the authors then identify the different facets of the educational opportunities offered by connected gaming, i.e., computational concepts (functional elements of programming such as loops, variables and conditionals), practices (programming activities related to implementation such as debugging, reviewing and testing) and perspectives (expressing, connecting and questioning to broaden perceptions towards computing), as well as content-related knowledge (such as STEM and language arts) and learning about learning (transversal skills related to metacognition). In addition, the argument is made that making games shares the same learning features of playing games (as highlighted by Gee, 2003), by promoting complex problem solving, motivating learners' engagement, offering rapid feedback cycles, fostering perseverance, and offering opportunities to share with others.

The Social Side focuses on the collaborative aspects of connected gaming. The chapter first traces the history and success of *Quest to Learn*, a public school where the teaching curriculum is based on students inventing, creating and sharing games with technologies. Afterwards, Kafai and Burke advocate for the social nature of connected gaming, in line with Progressive pedagogies, especially Dewey's views on situated learning and Papert's perspective on the social aspect of learning through technology. Reviewing a broad selection of studies and initiatives, the authors highlight different collaborative game making modalities, from pair programming to large-scale projects and online creative communities, considering learning and game making as inherently social activities. The chapter finally raises some challenges that occur when bringing such activities into schools, like matching curricular objectives, meeting evaluation standard, and adequately giving credit to freely available content.

The Cultural Side intends to understand how learners can access and connect to gaming and technologies. Relying on several illustrative examples, it denounces the exclusive character of the digital culture, as well as the unbalance and stereotyping that feature its landscape in terms of gender and minorities. Kafai and Burke then examine the potential of game playing and making as a "pathway into STEM" (p. 69) for girls and African American male youth. The authors critically examine the shortcomings of this strategy, recognizing that under-represented groups' interests and values influence on their participation into gaming and computing. The authors finally call researchers and educators for creating more inclusive cultures of connected gaming.

The Tangible Side concentrates on the multimodal aspect of game making. After highlighting the return of traditional card and board games, the authors attract the reader's attention to constructionist practices which move beyond the screen, by proposing hands-on experiences which extend coding to physical world. They provide numerous of examples of such hybrid environments, including computational construction kits, augmented boards and wearable controllers. By combining physical and digital artifacts, old and new materials, such environments take students through key-computational processes (e.g., prototyping, making, testing, debugging and iterating) and provide them with transparency to understand how technology works. In this context, constructionism is placed at the "intersection of programming and engineering" (p. 88), allowing for mediating cognition by artifacts.

Lastly, the Creative Side walks the reader through tools and technologies for creating games. After describing the concept of *microworlds* (i.e., environments where prerequisites are built and learners become architects of their learning), the authors examine various educational game making applications, in the light of Resnick and Sylverman's metaphor of house building (2005): low floors (accessibility and ease of use), high ceilings (usefulness for building complex constructs and for experienced users), and wide walls (capacity to allow for a variety of creations). Kafai and Burke add a fourth criterion - open windows - to define the possibilities that the tool offer to share

creations within digital communities, so to encourage liberal modding, peer-to-peer feedback and online collaboration. In this manner, they advocate for “a vision of connected gaming that values all forms of computational participation” (p. 118). The authors finally call for a focus on project-based, collaborative learning, as well as the development of reliable assessment tools for measuring students’ learning through game making.

The conclusion chapter returns to a wider view; it connects the different sides aforescribed, looking at the growing phenomenon of Minecraft, where “playing and making games is coming together” (p. 125). Kafai and Burke advocate for connected gaming as a form of computational participation in which learners create with and for others, develop a sense of “digital citizenship”, and become “full participants in their respective communities” (p. 125). In a final call to action, the authors highlight the need to promote an inclusive and sustainable participation in connected gaming, as well as to deeply engage students in meaningful learning experiences based on social practices.

In *Connected gaming: What making video games can teach us about learning and literacy*, Kafai and Burke endorse the educational value of connected gaming. Their arguments are original and effective, drawing evidence from an exhaustive review of scientific studies, but also recent developments, grounded examples and stories, as well as historical and contemporary cultural references. Following an analytical and critical mindset, the authors address different facets of connected gaming in a balanced fashion, thus providing the reader with a holistic and informed vision. The book’s assumption is well contextualized in the contemporary DIY ethos, and contributes worthwhile information to a growing field of study.

With regard to the form, ideas and concepts are described in clear language and embedded in a well-organized structure. The book is engaging: it provides illustrative examples and vignettes, as well as children voices which give life to contents. The notes and list of references offer a valuable resource for those interested in going further.

As for criticism, the book does not offer concrete guidelines on how to best integrate connected gaming approaches into formal learning settings, or to overcome the challenges that may occur when applying game making in today’s classroom. In addition, the authors only briefly mention handheld mobile devices as potential platforms for creating games; an in-depth discussion on the design and sharing affordances of those tools would have informed readers about the interrelation between mobile learning and constructionist gaming. Finally, broadening their scope to the creativity research body would allow the authors for reinforcing and sharpening their assumptions, especially regarding the potential of connected gaming to develop creative competences.

As final remarks, the book constitutes an excellent source of insight for educational researchers and practitioners, and may support reflection on current trends in their field. From Logo to Minecraft, the reader is taken on a journey into the digital gaming and making culture and history. The authors achieve their goal of demonstrating the potential of playing and making games for learning and literacy. Beyond this, they successfully accomplish the difficult task of situating game-based learning in the current education society, engaging youths in becoming active contributors to the digital culture.

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