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Avoiding Educational Technology Pitfalls for Inclusion and Equity

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Abstract
The integration of technology in learning, from a cultural perspective, continues to be of concern to many. The concerns include understanding the use of tools in meaningful ways, designing learning experiences where learners retain agency in learning, avoiding unintended consequences in learning, and reconciling perspectives to allow natural learning to flourish. The purpose of this article is to encourage a healthy discussion regarding how designs may be created considering common cultural belief systems. The discussions presented will challenge how learning has been understood in the past, how it is being understood now, and how it may be designed, with thought to how contextually-cultured learning pathways can be achieved.

Keywords Educational technology · Culture · Innovation · Guided participation

Introduction

Designing learning experiences that only focus on rote learning creates a divide between the learner and the context (Brown et al. 1989). Nonetheless, these designs and experiences still occur, which leads to learners retaining information that is isolated from context (Brown et al. 1989). The prevalence of such disconnection also hinders learners from owning and managing their own learning, and self management increases and improves the learning process (Hannafin and Hannafin 2010). Educational technology producers (i.e., educational technology developers and learning experience designers) need to beware of the pitfalls of creating technology tools and learning designs that limit a learner's agency to strategically decide how to learn and make meaning of new content. This conceptual paper follows the premise that recognising that learner-centered designs within a situated learning approach (Lave 1996) that promotes authentic activity (Reeves et al. 2002; Herrington et al. 2014) and leverages the integration of technology tools is the best approach. Such leveraged technology integration contributes to the learning process by guiding participants in learning experiences (Rogoff 2003) that support deep learning outcomes that are relevant to them.

Individuals in communities, and communities as whole, approach learning in different ways, as their cultural processes include the everyday practices that demonstrate how they live, understand relations, and survive in their own contexts (Rogoff 2003). This means that cultural perspectives of learning may be contextually diverse, even while conforming to the social structure and the value system that guides governance of the community. Living in this context can allow every community to create customized learning goals and standards, and therefore, determine how learning occurs within each culture's perspective (Rogoff 2003). Awareness that needs, activities, and priorities may differ, and that these differences are valuable, can guide the development of techniques and tools to perform work and to assist in learning within context. Such an intrinsic purposeful relationship with technology demonstrates why technology may be defined as "the systematic application of knowledge to achieve a purpose valued by a group or a society" (Spector 2014, p.5). The alignment of what is believed from each community's perspective, with what is needed to learn in the community's specific environment, creates a strategic approach towards learning and the tools used for learning. These beliefs guide the mindset, mental model (Cabrera and Cabrera 2015), and, most importantly,

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the lens that is used to understand learning in each respective environment.

Technology and tools not only help achieve a shared purpose, but Wenger (1998, p.59) states that "...tools reify the view of the activity," thus elaborating on the notion that technology tools can influence how a learning activity is materialized within a community environment. Wenger also goes beyond the reification of the view, to explain that tools change the "way one goes about" doing things (1998, p. 59) and, thus, can contribute to and influence how learning and knowledge are socially constructed in each environment (Bourdieu 2005). This is particularly important for educational technology producers as they incorporate technology into learning settings, thus contributing to how knowledge is shared and generated. While new ways of pursuing learning are being formed, it is key that developers and experience designers consider how learning designs "disseminate crafted mindsets" and influence the way that users of education systems, and, ultimately, learners within those systems, think about learning activities (Squires and Preece 1996; Moore et al. 2014). Developers and designers need to be aware that they set and propagate practices with their designs, and that it is crucial for the sake of supporting learners' agency that they avoid the pitfalls that decontextualized current learning designs and practices.

Cultural perspectives of learning are diverse, and yet they can be complementary. The dependence on how learning is devised based on belief systems, access, and use, forms the reason for learning. The integration of technology in educational settings requires the acknowledgement that information and communication technology (ICT) community networks are creating access that produce the global interconnection that "flattens the world" (Friedman 2005). The notion of a flat world extends the idea that human beings are living in a "global village" (McLuhan et al. 1968). This introduces the consideration that human beings may benefit – or not, from how data and technologies influence the adoption of new practices through the use and access of technological tools. This raises the question of whether the technology tools will replace local practices or complement them. Complementing the communal belief system fosters localized solutions to learning. This approach can be characterized as a "both-and" solution, which is a post-industrial paradigm of instruction (Rogoff 2003; Reigeluth 2012) that transcends the "either-or" mindset of the industrial era, and follows a systems-based change approach (Watson et al. 2008). The "both-and" approach demands educational technology producers be more technology savvy, while being more culturally considerate in their designs (Chavajay and Rogoff 2002). This allows for mindful incorporation of new perspectives to enrich learning experiences, by stimulating the strengths of local cultural processes, instead of alienating the communal perspective.

Using and Designing with Technology and the Associated Pitfalls

As a systematic application of knowledge to achieve valued purposes (Spector 2014), technology is known as a tangible solution that helps people do tasks better or in an easier way (Mitra 2010). Thus, technology is the result of the combination of human-centered design, creativity, and the available and accessible science understood as knowledge. Human-centered-design technology becomes an extension of the user to improve movements, performance, and achievement in general. Users understand the tool, but the tools also incorporate and "respond by conforming to" the users. To make the tool conform to the users and their needs, designers consider the way the tools behave, the actions they perform, the context of performance, the outcomes that are expected, and many more aspects related to the users' needs (Silius et al. 2003). The features present in technologies can be matched to the needs of the users, which includes their mindsets, in an effort to create a human-machine partnership. Users approach the tools from their own cultural mindsets, while technology tools are designed, developed, and created from the designers'/developers' own perspectives. When creators of technology tools make an effort to match the cultural mindset of the intended users, and use that as the foundation for creating new designs, the technology makes sense to the users and enhances their experience (Silius et al. 2003).

Alienation occurs when users do not understand how a technology feature works but, most importantly, when the tool creates a distance between the user and the task that is being performed, which results in unwanted outcomes (Mitra 2010). Alienation also occurs in learning settings when learners perform and complete tasks without understanding the purpose and the role they play in the learning process. The idea that a partnership should be formed between the learner and the intended solution should be an inherent thought to a designer. This thought is measured when tasks are performed based on an informed purpose, thus achieving deeper learnings and transformative outcomes. The absence of this partnership represents the disconnect from societal needs, which are key parts of the underlying learning structures (Scharmer 2013). If societal needs are not incorporated into the system of learner experiences, their absence will inevitably produce disconnected ways of thinking.

In the context of education, schools as institutional models can be considered as a type of technology since they are designed to combine creativity and learning science in response to the population's needs. These needs reflect factors based on time, context, and cultural processes. The industrial age factory-model for learning (Reigeluth and Karnopp 2013) served the industrial era by providing efficiency to the learning process; schools at that time created curricula that were set for learners to "acquire" content with someone else deciding

the purpose of the lessons. Rogoff (2003) refers to this model as "western schooling" or "assembly-line instruction" to illustrate that lessons "happened" to the learner. As the evolution of technology continues to develop in response to such an "increasingly pervasive" (Rogoff 2003, p. 13) model, it is inhibiting for teachers to motivate their learners, thus disconnecting them from their own interests and learning needs (Herrington and Oliver 2000). Furthermore, norm-referencing and standardized instruction (Reigeluth 2012), using technologies that are void of users' contextual attributes, detach users from experiencing authentic learning – which is useful to the life of their communities. In an era when digital technology is developing and improving at a fast speed, educational technology producers need to be mindful of how they integrate technology that may create more divide and reinforce behaviors that are far from desirable. In this article, we describe four pitfalls that relate to the assembly-line instruction paradigm of learning and the alienation that is created when technological solutions and designs do not incorporate cultural perspectives, causing learners to lose agency of their learning processes. These pitfalls are seeing learners as consumers of technologies, forgetting that the ultimate goal of education is to improve the quality of life, reinforcing unwanted practices that bring unintended consequences, and ignoring the autonomy and strategic intention of learners.

Pitfall 1: Learners as Mere Consumers of Educational Technology

The Greek origin of the word technology, *technikos* or *techne,* is related to art and its materialization into an "artefact" (Mitra 2010). Art is the consequence of a creative process and, as such, technology is founded on the act of being creative (Scharmer 2013). The principle consideration in the design of technology, as it relates to user attributes, is to remember that the user is not just the consumer of the product being designed, but also the "prosumer" who uses the technology as a tool to produce designs (Schaffert and Hilzensauer 2008). This means that the use of the technology requires that the end-product be contextually user-friendly but also be contextually-functional in its use. This way of thinking becomes validated as technology is used in education where designers are producing artefacts for learning, and not just artefacts for usage (Moore et al. 2014). Understanding how technologies are designed and their associated tools are used, and for what purpose, especially in the realm of education, needs a different acknowledgement. A community of educational technology producers must first become a community of learners in order to stay grounded toward the needs and strategic survival of the environment (Wenger 1998; Bourdieu 2005; Rogoff 2003). The awareness that designing for learners differs from designing for users, both in thought and in practice, is acknowledged but not sufficiently reflected in the products being created and disseminated, which creates a continual cycle of alienation-focused solutions (Moore et al. 2014) (Fig. 1). As a form of technology, the industrial-age school model follows a particular mindset that separates agency from learners and is, therefore, contrary to learning initiated by the learner (Lave 1996; Rogoff 2003; Hase and Kenyon 2013). Recognizing how much technology has detached learners from the actual learning process, and the unintended consequences of such disconnection, is taking precedence when new learning designs are created.

Pitfall 2: Divides, Disconnects and Alienation

Partnerships with digital technologies to improve learning and, ultimately, to improve the quality of life, needs review. Education is a field that is critically related to the empowerment of human's creative nature. Designers in this field need to deeply understand the creative nature of human beings to enhance the characterizations expected in their designs. Improvement of the quality of learning through technology is being researched; however, experiences from the past decade still show little impact (Hernández and Sancho 2011). Educational technology and the related designs for integration are still following the factory-model school (Bobbitt 1916; Taylor 1914) . This continued disconnect signals a time for educational technology producers to engage in a new paradigm (Reigeluth and Karnopp 2013).

Scharmer (2013) describes technology disconnects in terms of technologies that are creativity-appreciating, and technologies that are creativity-depreciating. As the definition of creativity guides the narrative by discussing the act of creating and co-creating new content, knowledge, and tools, it should be known that creativity is universal in the sense that everything gets created and recreated, which allows for adapting, transforming, and progressing toward generation of new ideas and artifacts to share collective knowledge (Wenger 1998). Technologies can be seen as enablers of the creative potential of both users and learners. This can be

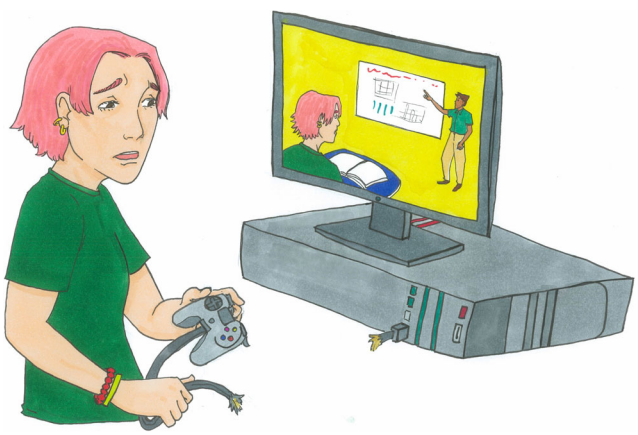

Fig. 1 Learners as mere consumers as opposed to being prosumers

extended to include schools as institutional models that can also generate and appreciate individual and collective creativity. Thus, designers should be aware of their own capacity to design from a creativity-appreciating approach as opposed to a depreciating approach.

There are many voices that are emphatic about the mindful development and use of technology, especially when designing for educational settings, that reconnects participants to their creative potential. Being able to participate in this time of technological progress and digital networks requires individuals to be conscious of their "center of gravity," to remain balanced while being embedded in a constant, usually chaotic, flow (Brown 2017). Being grounded in a digital age demands deep thought of what it means to be human, as special attention is needed to focus on developing the complex capabilities that are required to adapt in an age of continual change (Siemens 2016).

Instead of improving the life of humans, it seems technology is doing quite the opposite. Work on artificial intelligence is creating technology that is "more" human. However, when it comes to introducing technology to support learning, "educational technology is not becoming more human; it is making the human a technology" (Siemens 2015). New technology is being developed and introduced to the educational market every day, and it is common for users to become excited with every new gadget. When designing technology for learning environments, designers need to be conscious of being human-life centered. "We're talking about lives, we're talking about minds, we're talking about, ideally as Randy Bass puts it, the whole person" (Campbell 2017).

Scharmer (2013) emphasizes that individuals need to strengthen their "inner awareness" to deploy technology (Fig. 2). He highlights four issues that are not helping us move to a human-life-centered technology. The first is the idea of using technology to free individuals in order to enjoy more time. On the contrary, interruptions by digital devices are taking away our capacity to focus and pay attention. Second, technology can create a belief that anything can be fixed with newer technology. This is without deep thought to the underlying causes of the problems that need fixing and thorough consideration to how the solutions are made. Third, investment in research and development happens primarily (70%) in industrialized countries, driven by profitability expectations and/or political decisions. Finally, not all technology empowers users to co-create. Instead, users are becoming passive recipients of content that others produce. Thus, in the field of educational technology, producers need to strengthen their own inner awareness as they create and integrate technology in learning spaces. They need to move from the industrial factory-model that responded to narrow industrial practices, to a new systems-view of learning that is broad, holistic, and promotes learning from diverse cultural perspectives.

Fig. 2 Move away from non-strategic use of educational technology

Pitfall 3: Technology and Unintended Consequences

As Wenger (1998) points out, tools are used to perform actions, but the process of creating the tool, is a process of reification. This is a "process of giving form to our experience by producing objects that congeal this experience into 'thingness'" (Wenger 1998, p. 58). Reification through technology not only captures the experience, but also shapes the way that the activity will be performed. Wenger uses word processors as an example of how technology captures the activity of writing but also how writing changes because of the use of word processors. Technology creates feedback loops in which activity provides input to shape tools, but tools also shape activity. Through tools and technology, users learn about activities. To date, factory-model schools, understood as technology, have shaped formal learning; learners learn about learning through schools and their tools. The questions for educational technology and learning experience designers are "how should formal learning be shaped?" and "what should learners learn about learning in formal settings?"

Technology as a reifying element shapes humans; it shapes the experience of the user by influencing the nature of the activity that is being performed (Wenger 1998). By modifying their performance, technologies end up shaping the way humans think (Carr 2008). Some of these outcomes may be intended, but some others are not. Therefore, extreme care needs to be observed, especially in educational settings, with the tools that are being introduced and the way they are used. Strategic thinking is necessary to consider the ultimate performance that will be

reinforced and how behavior will be influenced while the tool is used. Unintended consequences are called *externalities* in the field of Economics (Scharmer 2013) and such (externalities) and unwanted behaviors need to be anticipated and considered when technology is chosen and used – and if possible even earlier: when it is designed and developed.

The notion of externalities or unwanted behaviors may be illustrated by the introduction of plastic to replace glass. Early in the past century, products were commonly stored in glass bottles and jars. When carrying a glass bottle, one needs to be careful to avoid breaking it. Movements are slow and very mindful to avoid striking the glass with something that may break it. In certain circumstances, it is even useful to hold the bottle and feel it close, keeping the connection with the object, to make sure that nothing harmful is happening to it. The externality of glass technology through the actions that it motivates is the habit of having mindful behavior, whereby one is conscious about what is happening and careful to guarantee safety of the product. When actions repeat constantly, habits develop; "habits are dispositions to repeat past responses" (Wood and Neal 2007). When the technology of plastic replaced glass, different behaviors were reinforced. No extra care was needed to avoid breaking it. The person carrying a plastic container didn't need to feel it close to make sure that it was safe. It could be placed inside a bag and carried without being mindful of the content. Currently, people know that even if something strikes the bottle, no serious damage will happen. Different from the glass behavior, a less mindful behavior is being reinforced; careful attention to movements and actions is no longer needed. Such may be the externality of plastic and with regards to this field, what externalities may be identified with the use of information and communication technologies?

Wenger (1998) warns us of the "double edge" of reification and the risk of reified objects to lose their meaningfulness and to become potentially misleading. Perhaps this "double edge of reification" needs to be interpreted in education as the unintended mindsets that technology and the factory-school model has shaped. The risk of such externalities is that communal cultural practices may be lost. An example of this double edge reification and reshaping are the findings of researchers Chavajay and Rogoff (2002) that demonstrate that traditional indigenous Mayan mothers with little Western schooling engage in a horizontal multiparty way with their children; whereas Mayan mothers with several more years of schooling (12 or more) tend to follow a more hierarchical relationship with their children. Traditional collaborative organization was reshaped by schooling practices.

As Mitra (2010) suggests, improvements of technology to make tasks faster and easier are sometimes the ones that make technology alien and generate unwanted consequences (Fig. 3). Unwanted consequences result when the whole system is not considered when designing a solution. In factory-model schools, learning is divided arbitrarily into specific periods of time to make it easier for instruction to be delivered. Concentration for short periods of time is reinforced, as opposed to allowing for the human ability of getting in flow for creative and deep reasoning (Csikszentmihalyi 1996). Additionally, content is divided into subjects that are not necessarily integrated later in the learning process to allow transfer of learning to complex contexts. Externalities of factory-model schools as the current technology of formal education may be the lack of mindful concentration that is needed to develop expert performance (Goleman 2014) and a thinking style that is "overly focused on the parts (reductionism) to the exclusion of the whole" (Cabrera and Cabrera 2015, p. 13).

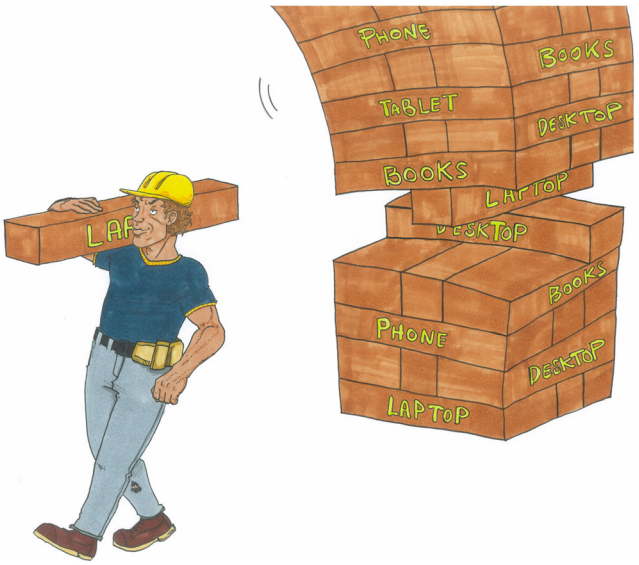

Fig. 3 Beware of the unintended consequences of educational technology

Pitfall 4: Piecemeal Changes that Reduce Agency, Strategic Intention, and Autonomy on the Side of the Learner

Personalized learning is a technological innovation that aims to help learners individually fill the gaps and the prior knowledge that they are lacking to achieve specific learning goals (Paquette 2015). Adaptive learning systems identify useful resources and recommend personalized learning paths to learners after a diagnostic activity (Paquette 2015). Usually, the adaptive software that helps personalize the experience makes decisions for learners as the tool uses a predetermined skill-building path of exercises towards success. By having adaptive software make decisions for learners, there is the risk of the learners losing *agency* of their own learning process. This is emulated from the traditional school system where most of the decisions concerning learning are made *for* learners and not *by* them (Fig. 4). By making decisions for learners, they become separated from the responsibility of their own learning, thus, becoming unengaged. Learners are detached from the process, and education becomes something

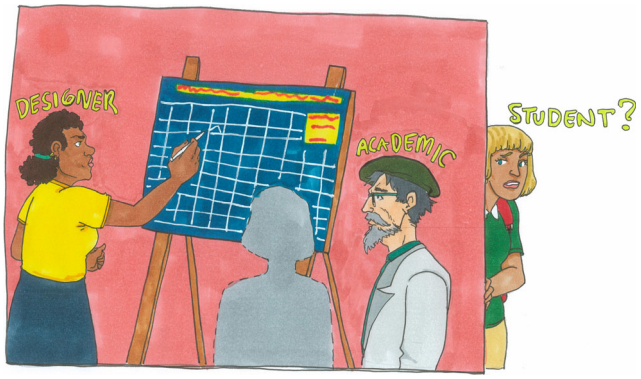

Fig. 4 Avoid decisions concerning learning that are "for" learners instead of "by" them

that happens to them, instead of a development process that initiates within them. Teachers as well are at risk of being separated from the learning activity, thus increasing the alienation of the process (Emerich 2018). Limitations of the current recommended methods are recognized by designers and developers alike, and efforts are being made to improve designs (Paquette 2015).

Changes that concentrate in fixing only a part of the system are usually described as "piecemeal changes" (Reigeluth and Garfinkle 1994). For Scharmer (2013), such technology whose purpose is to provide quick fixes also represents a disconnect. Learning experts criticize how new technologies are following the informational understanding of teaching (Papert 1999). Multiple educational technologies have been developed, from learning management systems to personalized learning software. However, many of them still follow a narrow perspective to fix the problems encountered in the factory-model school, without considering that such problems are probably a consequence of the model itself. In everyday situations, there is no arbitrary division of content or attention. People perform in physical and social contexts; they seek knowledge and they keep their concentration, motivated by the genuine interest of reaching a goal that is meaningful to them, with the understanding that it was initiated by them (Brown et al. 1989).

Reconnection with the Natural Way of Learning to Leverage the Integration of Technology Tools in the Learning Process

To avoid falling into all these pitfalls, educational technology producers need to honor and respect the natural way of learning, which is situated in cultural contexts (Lave 1996), originates strategically from the self (Rogoff 1990; Hase and Kenyon 2013), and shares "universal features" of human development built on "local variations" (Rogoff 2003). Consciously fostering learners' agency, keeping quality of life as the ultimate goal of education, using systems thinking to anticipate unintended consequences, and being mindful of the learners' autonomy and their particular cultural processes to design technology integration solutions, will bring the highest leverage (Senge 2006) to the learning experiences.

Barbara Rogoff (1990) conducted research in Mayan communities located in the highlands of Guatemala. Her observations allowed her to generate a particular sociocultural learning perspective, a particular way of learning that is inherent to the Mayan culture but that is also present in other indigenous and non-indigenous cultures around the globe (Coppens et al. 2014). She uses the term "guided participation" to describe how humans learn and develop as they participate and adjust their participation in dynamic socio-cultural activities in their communities (Rogoff 1990, 2003). Such type of learning is what Jean Lave also describes as learning that happens in social interaction in informal settings embedded in everyday activities, through "demonstration, observation and mimesis" (Lave 1996, p. 151). Her research highlights the role of cultural values and cultural ways of living in how children learn to think and learn to learn, throughout their socialization process. Rogoff's and Lave's research is also an invitation to consider the universality of such type of learning and the general development processes that may be seen around the world. These processes are highlighted in the display of families structuring children's activities and providing guidance while participating in joint activities, which culminate in how children are "active participants of their own socialization" (Rogoff 1990, p. 11).

Leveraging educational technology integration through the natural way of learning means fostering observation and attention to the activity of experts, just as children naturally do. Keeping the connection with real life provides children with multiple opportunities to focus closely on how adults perform and pitch in whenever possible. Thus, educational technology and learning designs need to allow and encourage learners' participation in real contexts to learn from skillful members of communities (Brown et al. 1989). Such designs need to allow the natural flow of learning in which observation is not passive, but very active, to prepare them to participate whenever there is a chance (Rogoff 1990).

Home-style learning, as Papert (1999) named this natural way of learning, needs to make its way to formal learning settings. This is to allow learners to explore and make meaning of the world around them, initiating interaction with more expert peers or adults whenever they feel the need for help. Home-style learning or guided participation needs to influence school-style learning to generate learning communities. The participants in these communities would create their own tools based on their needs or use the software available to improve the quality of their interactions and learning. The factory-school model has artificially changed the natural way of learning in community (Lave 1996). Thus, using apprenticeship

and guided participation as natural ways of real-life learning can promote the much needed success for learners.

Leveraging learning through design means allowing contextual observation and guided participation to lead the way to learn, thus following a more systemic perspective, which is "the natural order of the universe and life" (Haines 2000, p. 4). For cultures that follow a systemic perspective to understand life and learning in their communities through guided participation, such as in the Mayan culture, technologies that make decisions for people may seem alien. Children who engage in guided participation experiences develop skills such as self-regulation, achievement-of-self-set goals, and evaluation of the choices made, all of which are traits of a strategic mindset and a lifelong learning approach (Haines 2000). As Rogoff's research has shown (1990), children learn to become adaptive learners through guided participation. Children orient the guidance that adults should provide. They initiate the interaction and they demonstrate responsibility of their own learning by grasping essential elements of the activity, adapting to understand the situation, and adjusting to the understanding of others (Rogoff 1990). Learning designs that foster such practice also encourage the development of adaptive expertise because they honor the meaningfulness of the creative application of knowledge (Verschaffel et al. 2009) that are so needed for meaningful innovation and systemic change.

Educational technologies have generally concentrated on improving an informational teacher-centered paradigm that strongly deviates from the sociocultural perspective of learning that is present in the socialization of children, as well as in the learning activities of adults in many native communities. In such communities, communication, language, and dialogue are the main elements of the system (Rogoff 1990). Joint or shared activity sets the conditions for learning to the extent that, in early childhood, the roles of the learner and the helper are not differentiated, becoming a "syncretic whole" (Vygotsky 1978). Reigeluth and Karnopp (2013) suggest that it is time to "break the mold." New technologies need to be created, using a different mold or paradigm, one that is congruent with universal development and socialization practices.

A new generation of educational technology innovation is needed to support "transparent open learner models" which allows learners to be in control and take responsibility of their own learning (Essa 2016). This is innovation in which technology development follows a human- or life-centric approach, where learners can shape technologies and give them meaning to develop their creative potential (Scharmer 2013). Technologies need to facilitate negotiation of meaning (Wenger 1998) by bringing learners and educators closer, to allow joint participation and guided learning (Rogoff 1990). Learners and educators need to be able to configure the spaces (digital or not) where they can interact, connect, and be aware and in control of their own needs for learning. Education needs to deviate from the artificial traditional system where assignments get submitted and marked, into an ecosystem where the community meets and learners engage in shared problem solving with educators who orient the process as learners contribute or pitch-in (Rogoff 2003; Coppens et al. 2014). Educational technology producers need more mindful attention to avoid technology that promotes detachment from the deep creative capacity of learners. Technology that is integrated into learning environments needs to foster learners' connection to the need to know, learn, participate, and contribute to their communities. It is no longer a matter of learning experience designers becoming early adopters of technology, but a matter of being selective adapters and co-creators of technology and school models to preserve valuable cultural processes (Rogoff 2003). It is a matter of demanding that technologies and school models are culturally sensitive and appropriate by matching the mindsets, practices, and values of learners in order to meet their real needs (Farahani 1996; Chavajay and Rogoff 2002).

Conclusion

Educational technology needs to be transformative (Mehaffy and Salingaros 2011) to evolve with participants of learning communities as they connect, feel each other, and feel learning happening. The socio-cultural perspective of learning remains highly valid in an era of broad technological change with the intent of promising a better future, but which also carries the risk of deeper disconnections. By describing the risks of piecemeal and either/or solutions for learning as pitfalls that need to be avoided while designing technology integration in learning settings, we have tried to promote more discussion of the need for new technologies, including models of schooling, that originate from a deeper understanding and respect for cultures, socialization, and development. We are aware that many design frameworks/models do not discourage such considerations and thus it should not be assumed that including communal characteristics within learning designs is being prevented. Instead, we would like more deliberate and attentive learning design approaches to ensure that these characteristics are saliently displayed through the learning design experience.

Designers need to use a *both/and* mental model to create systems where diverse cultural values find their place. Many communities have been mainly consumers of technology developed without any cultural consideration. Therefore, the consumerist mindset is propagated into each community while ignoring the ability to create and incorporate self into technology solutions. Diverse cultural processes need to be considered to allow room in learning designs for recombination and co-creation in order for communities to adapt technology from their own needs and perspectives. This invites further discussion into the evaluation and research of learning

experiences as an extension of the needs analysis process, with careful consideration of the learner and the community in which the learner is situated. Thus, understanding that the context of self as a user and learner can have different meanings from different perspectives, requires a reevaluation of how culture is seen and considered (Rogoff 1990; Moore et al. 2014).

All learners deserve to feel successful when learning. Respecting the learning practices of communities allows us to be mindful of how and what is considered in designs for learning, to encourage ecosystems where learning happens naturally in active engagement by participants who are situated in real life contexts.

Compliance with Ethical Standards

Ethical Approval This article does not contain any studies with human participants or animals performed by the authors.

Conflict of Interest The authors declare that they have no conflict of interest.

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