

Chapter 3

Supporting the Needs of Twenty-First Century Learners: A Self-Determination Theory Perspective

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3.1 Introduction

In recent discussions of the modern educational landscape, much thought has been given to the substantive and methodological changes resulting from technology. New technologies provide learners with increased opportunities for interaction with learning material, from individual smartphone and tablet applications to digital whiteboards structuring whole-class instruction to entirely online learning environments with no classroom structure. As the use of these advances becomes increasingly common in education, students rapidly grow accustomed to their use. The question then arises as to how these advances influence students' motivation.

From a self-determination theory (SDT; Deci and Ryan 2002) perspective, motivation develops from the intersection of autonomy, relatedness, and competence (ARC) needs satisfaction. When learners feel that these three basic needs are met, they will engage in learning activities in a self-directed fashion (Ryan and Deci 2002). Autonomy represents the basic need for individuals to feel that they are acting from their own volition, freely and voluntarily participating in an activity. Relatedness represents how connected individuals feel to the other members of a group during an activity, and the strength of that positive connection. Finally, competence represents the belief that individuals can successfully interact with the world to achieve their desired ends. This chapter sets out to review the digital influences on education, and how teachers may address some of the concerns that accompany the technological-medium-based changes to meet students' needs.

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3.2 Motivating Digital Environments

According to SDT, learners interpret external events according to whether they support these basic needs, and then use this information to interact with the world appropriate to their internal goals and desires (Reeve 2012). In nondigital learning environments, teachers' need-satisfying practices have been shown to reflect positive in-class engagement and learning outcomes (Jang et al. 2012; Skinner et al. 2008). According to this framework, a supportive and engaging environment is crucial to promoting motivation.

In a similar fashion, numerous studies in this research paradigm have indicated the ways in which individuals interact with digital games. Across cultural contexts, individuals who persist in digital virtual worlds largely do so because the experience satisfies basic psychological needs, perhaps better than the real world (Przybylski et al. 2010; Wang et al. 2011). From an SDT perspective, games are designed to be need satisfying in order to make them more appealing and interesting for long periods of time (Ryan et al. 2006).

Gaming then represents an act of volition (Ferguson and Olson 2012), originating from the player and allowing the individual to escape, express their desires, or achieve feelings of success (Yee 2006). Gamers immerse themselves in the experience of the digital world, whether that world is an online multiplayer role-playing game like *World of Warcraft*, a physics puzzle like *Angry Birds*, or first-person shooter like *Call of Duty*, because it is a fulfilling experience. If education seeks to promote optimal experiences and well-balanced passion, greater autonomy and respect for individuals volition is necessary (Lafrenière et al. 2009; Wang et al. 2008, 2011).

The important element to remember for both games and learning is that content matters. Individuals return to the gaming experience not because of the digital environment, but because the content that is provided by the medium has previously satisfied their needs, and they expect it to do so again (Rotter 1966). It is hard to imagine gamers returning to the game world if the content on some level does not satisfy them internally, and learners will avoid activities which thwart perceptions of autonomy, competence, and relatedness. Whether this experience provides the individual with a new challenge, the opportunity to solve an interesting puzzle, or the chance to collaborate and compete with friends, the degree of need satisfaction predicts whether they will willingly return to the experience again.

3.3 The Digital Age of Education

Recent work by educational commentators has stressed the importance of embracing and employing digital and game-oriented measures for improving learning. Researchers and educators such as James Gee have pointed the positive aspects of games, with benefits as diverse as identity formation and role modeling, building

relationships through social interaction, and requiring conceptual understanding of complex or ambiguous situations (Gee 2007). Numerous other writers have followed suit with ideas for how to apply these principles in the educational setting (e.g., Sheldon 2011), with commentary on everything from content organization and presentation to learning environment designs.

With regard to the adoption of online learning platforms for use in university classrooms, universities have been pushing to increase online content delivery, and while many universities have not yet adopted massive open online courses (MOOCs), many are planning for them. Between 2010 and 2011, the number of students taking these courses in the USA alone increased by more than 500,000 to a total of 6.7 million (Allen and Seaman 2013). At the time of this writing, even greater numbers and increases seem likely. As much as 99% of the incoming student body may now be bringing laptops to university (University of Virginia 2009), and large numbers are similarly bringing them to classes (Fried 2008).

Recent surveys have also shown that many secondary school students in the UK find reading books to be embarrassing or undesirable, indicating the desirability of digital platforms for promoting literacy (Clark 2013). New innovations for more independent and open-source learning may provide learners with opportunities to master content through their desired learning medium. The worked examples (Cooper and Sweller 1987) shown through open-access learning platforms such as Khan Academy (Khan Academy n.d.) offer students not just one but many chances to interact with learning material, and have been touted as an educational revolution by the popular press. By offering students the chance at an inverted classroom model (Lage et al. 2000) where lectures happen for homework and students complete activities in class, these online courses give students a greater chance to autonomously interact with learning material, guided and structured by teachers' in-class activities, exercises, and discussions.

In considering the development of motivation for the Net Generation, we must think about both content and medium changes brought about by digitally oriented learning environments. How do the traditional content and new media interact? How do learners perceive the juxtaposition of the two? The substantive changes brought about by technology have been minimal. Besides the technology itself (and the developments it has allowed), very little basic content has been added or changed by digital innovation. A cursory study of learning sites like Khan Academy will display learning content remarkably similar to that of any standard textbook; mathematics requires comprehension of numerical values and logical relationships, learning to read requires phonological awareness of written sounds, the scientific method is based on a cycle of observation and testing hypotheses, foreign languages require knowledge of vocabulary and grammar, and Rosencrantz and Guildenstern are still dead.

Rather, the means by which this information is communicated has been changed within this paradigm. The difference lies in the ability to choose what and when to study, and the connection of learning with individually driven interest and desire to learn. Thus, while the new digital media may offer choice and convenience, their ubiquity may also create motivational hurdles which will require careful navigation.

3.4 Digital Environments for Learning: No Panacea?

Research into the world of digitally oriented learning environments have shown that simply moving to a more digitized platform has not necessarily shown strong educational or motivational outcomes. In a comprehensive review of both quantitative and qualitative research on serious gaming for education, Michael Young and colleagues found that educational games may not yet show conclusive gains for all subjects (Young et al. 2012). One issue comes from the forking branches of choices learners make when gaming often differs with each replay of a game. Since, in traditional learning settings, some learners need to get the full body of information on three separate occasions before they successfully learn it (Nuthall 2002), designing games and stories in such a way that the complete body of knowledge is repeated sufficiently to ensure uptake becomes difficult. Some serious games may also lack the stories necessary to engage learners' full interests, or may not engage learners beyond surface learning.

Other reviews of the same topic have found some positive evidence for gaming. Using large-scale meta-analytic procedures, Wouters et al. (2013) demonstrated that serious games show benefits over conventional instruction (defined here as lectures, reading, drill and practice, and hypertext reading) in terms of learning and retention, though not so for motivation. Some moderation effects showed that serious games were more motivating than an active control group completing hypertext tasks or prompted learning activities, and had stronger motivational effect when they were not combined with other learning activities. This, unfortunately, contrasts with the finding that the best learning demonstrated by serious games was in concert with other learning activities. Further, serious learning games in this study were thought to be potentially less autonomy supportive, unlike numerous games investigated by Ryan et al. (2006), which may account for the lack of motivation-related results. As with the review by Young et al. (2012), these results show some positive evidence for the effects of gaming, but most conclusively point to the need to structure games which work to motivate and mentally engage students.

Some have made the claim that games may help in multitasking, though the evidence here is also inconclusive at best. Some researchers have found that video games may improve students' ability to carry out multiple tasks in laboratory settings (Stroback et al. 2012), while others have indicated the opposite (Donohue et al. 2012), especially with regard to more real-world tasks (i.e. answering difficult questions while distracted). This line of research seems likely to go back and forth before conclusive evidence is found, but the base theory of attention seems to indicate that, as yet the digital generation has not introduced any practically relevant abilities to allow for greater cognitive integration with digital technology.

The educational results with regard to increases in digital age learners' multitasking abilities echo the above psychological findings. Research on digital classrooms and attention has found that students who bring their laptops to class are more likely not only to multitask but also to distract others. This ultimately leads to decreases in learning for both parties (Sana et al. 2013). As with traditional conceptions of

learning, divided attention appears to be weakened attention (Kahneman 1973). The implications for classroom practice are many here, primary among which is that laptops in lectures may do more harm than good.

Even digitally integrated blended learning environments have weak to modest gains in terms of learning and motivation. Previous writings have identified how digitally integrated classrooms using interactive white boards (IWBs) are received positively by teachers and students (Smith et al. 2005). At the same time, this enthusiasm has not demonstrated the same level of even self-reported gains in motivation (Torff and Tirota 2010). Students receiving instruction in IWB classes showed statistically significant though minimal practical differences in their attitudes towards mathematics compared with students receiving instruction in traditional classroom settings. While digitally integrated environments may indeed show some benefits, the extent to which the classroom technology alone influences students' engagement and learning remains questionable.

To this point, gaps have been shown between the design of online learning environments and their ability to satisfy both motivational and learning outcomes. In a study of students' motivation in relation to online learning environments, Chen and Jang (2010) investigated SDT needs satisfaction in relation to time on task and expected and actual grades. Strong support for competence and autonomy had a positive influence on students' need satisfaction, and students reported strong expectations of high grades as a result of this support. Positive perceptions of the learning system also increased self-reported and measured time on task. However, final course grades were not strongly predicted by support, satisfaction, or motivation, indicating a disconnect between the motivation for the course and the learning that happened. Further, forthcoming studies have also shown that learning in digital environments may be perceived as inconvenient or lack real personal learning benefit (Fryer et al. 2014). These findings may indicate basic problems with online content delivery for both learning and motivation.

So may also be the case for independent learning via open-source learning. While research into this area has not yet been fully developed or organized, one issue that may occur with free platforms such as Khan Academy and smartphone app-based learning is the idea of motivational interference (Hofer et al. 2011), or the idea that another activity may be more attractive. Some twenty-first-century learners sum this up as "Facebook-itis." Both from listening to the stories of students and from my own experiences with digital technologies, no matter how determined people may be to use their electronic devices with the intention to learn or work, they may find themselves logged into social networking sites or "accidentally" push a game icon before they even think about it. This mirrors the more negative obsessive passion for certain games that some online gamers may experience (Wang et al. 2008).

Ultimately, while technology may provide greater choice, autonomy need satisfaction amounts to more than providing choices (Katz and Assor 2006). Rather, autonomy is a combination of agency, volition, and personally meaningful action. For all of these, choice is a part, but not the entire picture. Likewise, the medium of technology may not increase a sense of relatedness; quite to the contrary, recent changes through digital media such as social networking sites may actually foster

shallow relationships (Carpenter 2012). Finally, technology as a tool requires students to have at least some basic knowledge (Hirsch 2000), and will likely not improve competence further than a larger hammer improves the ability to drive nails; while the hammer makes the job easier than using a rock, it is the basic strength and skill of the carpenter's arm that guides the hammer. However novel and initially interesting technological developments may be, their use has yet to indicate basic changes in cognitive architecture (Willingham 2010), and their use will have a limited long-term effect on learning and instruction if they are not able to meet students' basic psychological needs of autonomy, relatedness, and competence.

3.5 Supporting Needs Through Self-control, Meaning Making, and Support for Relationships

While numerous issues remain with the digitization of education, twenty-first-century learners have indicated that the use of technology and other modern media is highly desirable (e.g., Clark 2013; Smith et al. 2005). Thus, from a SDT perspective, even knowing the traps and pitfalls associated with digital learning environments, supporting students' autonomy means meeting that desire to have classes, learning materials, and activities in a digital medium. These medium-based changes involved in the shift to digital learning represent a motivational reality that must be addressed by teachers, researchers, and administrators. Thus, the task for educators in motivating today's learners remains one of reaching students through their desired means while helping them successfully navigate the minefield of digital learning.

From the SDT perspective, motivating learners of this generation means building on the existing robust findings regarding building classroom motivation. Extrinsic rewards will show short-term gains but long-term losses (Deci et al. 2001). How we motivate students depends in large part on the way we structure classroom goals, and students with more externally regulated goals show less autonomous motivation and weaker learning behaviors (Vansteenkiste et al. 2008). How teachers interact with their students strongly influences how students perceive the value of tasks (Assor et al. 2002; Reeve and Jang 2006). Classroom dynamics have long-term effects on how students engage with learning materials (Skinner et al. 2008), and how teachers structure their learning activities through clear explanation, feedback, and authoritative (but not authoritarian) direction is strongly linked to positive autonomy need support (Jang et al. 2010; Sierens et al. 2009). In assigning independent learning, how teachers support students' psychological needs promotes positive and adaptive motivation for completing homework tasks (Katz et al. 2009; Przybylski et al. 2010; Wang et al. 2011). It should be noted that the majority of the research which gave way to the above principles for autonomy-supportive instruction was conducted in classrooms with twenty-first-century digital natives, further illustrating that SDT principles remain sound. In promoting self-determined motivation

among modern learners, considering how specifically to support and satisfy basic motivational needs becomes a priority.

In supporting learners' competence, self-control (Baumeister et al. 2007) will prove crucial in digital environments. Digital platforms offer much of the freedom, but not necessarily the structure and direction, necessary for learning. Based on the currently indeterminate and somewhat contradictory evidence regarding the influence of gaming and digital life on digital natives' multitasking and attention focusing abilities (Donohue et al. 2012; Stroback et al. 2012; Sana et al. 2013), the importance of self-control becomes increasingly apparent. Especially in light of findings regarding excess choice as draining (Vohs et al. 2008), demoralizing (Schwartz et al. 2002) or potentially overwhelming (Iyengar and Lepper 2000), interventions to provide learners with better self-regulatory abilities (Baumeister et al. 2006) and more flexible implicit ability beliefs (Dweck and Leggett 1988; Job et al. 2010) may offer educators a path towards more successful integration of technology, such as laptops and IWBs, in the classroom. This may be understood as a form of competence support, improving students' ability to make positive changes on their environments (White 1959), while helping them to personally and volitionally handle motivational interferences during nonleisure activities (Hofer et al. 2010, 2011). Thus, as a base for supporting learners' competence in digital environments, self-control-supporting interventions such as physical exercise, behavioral tracking, goal setting, and other monitoring systems (Baumeister et al. 2006) may help to improve students' competence for managing the troubles and distractions of the digital world.

In order to support learners' need for autonomy and interest, demonstrating the meaningfulness of the learning task is of greater import than creating games. As Jere Brophy discussed (2004, 2009), simply turning education into a game may both reduce the focus on the learning task and diminish the enjoyment of previously enjoyable activities. Thus, if educational game designers and educators are not careful in the design and implementation of serious games to support learners' needs, they may inadvertently reduce students' positive affect for gaming in general, turning games from an activity learners *choose to do* and into something *done to* them (Ferguson and Olson 2012), thus making them less desirable on the whole. Education and instructional practices in general have been indicated to facilitate this change in attitude (Bonawitz et al. 2011), indicating that instruction may *decrease* studying. This finding aligns with SDT, as it shows how increasing external controls may decrease autonomously directed behavior, as recent studies have shown homework may do (Katz et al. 2009, 2013; Katz and Assor 2006). In the same way, assigning games as homework or creating storylines where players feel that they are being manipulated or forced may have the unintended effect of reducing students' desire to play both in and outside of the educational realm. While there are likely readers who might see this in a positive light, as it might push students to go outside and exercise more or stop develop more traditional interests, it may just as likely promote behaviors even less socially acceptable than gaming.

At the same time, gamifying the learning environment, without truly turning it into a game, may indeed have positive effects on students' learning and autonomy,

if done right. Knowing how games satisfy psychological needs and promote interest (Ryan et al. 2006), and considering the necessity of extensive contact with the learning material (Nuthall 2002), teachers may structure their learning environments to support autonomy, create positive relationships, and build comprehension of the material by making each task individually exciting and meaningful. An interesting idea in the design of learning environments is to mirror gaming environments, including starting the semester with learners at level 1, 0 points, and asking them to work towards acquiring knowledge to “level up” and achieve passing grades by completing learning activities presented as “quests” (Sheldon 2011). This concept accepts the idea of the “learner as hero” in their own hybrid digital real-world narrative of learning (Rigby and Przybylski 2009). In structuring the reward system as “now that” achievements (i.e., “Now that your group has completed the ‘quest’, you may choose a quiet activity, or you can go help one of the other groups finish”) in variable intervals, teachers may help students engage without feeling controlled by a point system (Deci et al. 2001). While I am currently unaware of research into classroom effects of this intervention, studies using this methodology to promote motivation and learning may indicate of the validity of gaming as an autonomy-supportive method for teaching twenty-first-century learners. The crucial element here is to harness more internal, intrinsic elements of games in order to promote passion for learning and optimal experiences (Wang et al. 2011).

In supporting learners’ relatedness, understanding how learners interact with each other in the new digital world is an important step to helping learners smoothly integrate with the online and real worlds. In promoting motivation through the digital world, supporting learners’ positive relationships is a crucial step in improving motivation (Martin and Dowson 2009). While the digital world may indeed foster a sense of unreality and shallow relations (Carpenter 2012), helping students to recognize that events in the online world and the real world interact and have consequences may help to undo the sense that digital interactions are less “real.” To this end, interdependent group work on learning projects (“quests” in the above modality) has been shown to positively influence motivation (Liu et al. 2008). Structuring these activities so that learning groups interact both in digital and face-to-face environments may help learners to feel a sense that the two worlds are connected. Through the sense that learners strive towards a goal together may help learners to deepen their understanding and prevent problems (Marsh et al. 2011). Likewise, just as parents may encourage their children’s positive civic behaviors through time spent gaming together (Ferguson and Garza 2011), teachers’ active presence in an autonomy-supportive digitally augmented classroom may promote better student engagement and learning (Cornelius-White 2007). The creation of a community of learners capable of working together and understanding each others’ differences through a shared learning culture, all while moving towards an educational goal, remains crucial for motivating learners even when they do not meet face to face.

As a final note, even twenty-first-century digital natives have shown that stepping away from their smartphones and online worlds from time to time can replenish their feelings of vitality. In a series of studies, Ryan et al. (2010) showed how university students perceived natural, outdoor settings to be most supportive of their vi-

tality. Likewise, those who spent more time both outdoors and in natural settings felt greater subjective vitality. Returning then to the idea of physical exercise promoting self-control (Baumeister et al. 2006), taking the exercise outdoors and in nature when and where possible may help vitalize students and improve their self-control in the digitized classroom. In considering both learning motivation and well-being, this should not be overlooked, even for a more electronically oriented generation.

The above-mentioned methods represent the ways in which teachers may promote motivation for learning in a digitized society. While online coursework, IWB technology, and other digitized innovations may not promote learning and motivation in and of themselves, their use may indeed motivate learners by helping them to rationalize activities. Structuring learning activities such that the digital environment facilitates autonomy, competence, and relatedness support, while also providing opportunities for reinforcement, feedback, and growth is an essential step to promoting learning. The focus in self-determined twenty-first-century learning must be to balance supporting needs while at the same time ensuring that substantive learning occurs through the integration of digital and analog methods.

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