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Learning Perspectives on Digital Embodied Creativity Training

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Abstract

As training is increasingly digitalised in general education it becomes relevant to evaluate this new medium for learning. This is particularly true in the field of embodied creativity training because of its strong focus on the embodiment of creative skills. This paper evaluates potential levels of competence development when using a digital embodied creativity training program and it discusses the related themes of motivation for and transfer of learning. It finds that while digital embodied creativity training, through its gamification possibilities, might increase personal engagement and motivation inside and outside the classroom, the training should reflect relatable situations to real-life experiences to increase the transfer effect. The opportunity for skills acquisition from distance learning seems paramount, even though digital embodied creativity training may not support all educational aims right now, as some skills may be easier to acquire in face-to-face training settings. Further improvements in technology could change this in the near future. The paper stresses the need for further research on this emerging topic of digital embodied creativity training.

Keywords: creativity training, educational technology for creativity, embodied cognition for online learning.

Introduction

Creativity is the engine for innovation, and therefore creativity training is central to both education and organisational development. Education on creativity is unique because it tends to have a strong focus on the acquisition of skills necessary for personal creative performance. This brings about the importance of embodiment. However, embodied creativity training may collude with the digitalisation of learning that is currently taking place across the educational fields. Therefore, it makes sense to reflect upon some learning perspectives on digital embodied creativity training. Skill acquisition plays a key role across disciplines such as music, sports activities, driving a car or speed reading. The notion is that systematic training leads to better skill acquisition. It takes patience and time to perform systematic practice. However, once

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acquired, the skill may be unconsciously applied whenever needed. It becomes part of one's second nature. In some disciplines in education, including creativity, practice for skills acquisition is naturally integrated into educational training programs.

de Bono (2007) clearly identifies creative thinking as a skill that can be learnt through practice. Treffinger and Isaksen (2005) find that everyone possesses at least some potential for creativity and that training could lead them to greater aptitude and better results. Runco (2014) even argues that there may be little difference between the creativity of ordinary people and the creativity of our greatest thinkers. Great thinkers are not the same as everyone else. Runco (2014) finds that they "have idiosyncrasies. But they do not have a unique creative process that everyone else lacks" (p. 132). Furthermore, Runco (2014) claims that "education for creativity should focus on the fulfilment of potential" (p. 132).

Creativity training is essential for the development of creative skills and the fulfilment of creative potential. It may be defined as a program of any length for pre-schoolers, pupils, students or professionals that uses domain-specific or domain-general, fictive or non-fictive exercises based on theories or methods of creativity performed either virtually or physically with the intention of developing creative skills (Tang, Byrge, & Zhou, 2018). This kind of training has been widely studied since the 1960s with a consistent confirmation of significant effects (Scott, Leritz, & Mumford, 2004; Rose & Lin, 1984; Torrance, 1972). Nevertheless, almost all of these studies are experimental and rarely include perceptions of the level of competence development. Therefore, it is interesting to ask how digital creativity training may relate to the stages of learning.

Byrge and Tang (2015) introduced the concept of embodied creativity training as a category of training with the primary objective to make creativity a second nature for the trainees. The notion is to develop creativity to be a natural part of the personality of the trainee, rather than a method used merely to gain knowledge and understanding of theories, methods, processes and techniques that may, in the short term, stimulate creativity. Their research found evidence of significant effects related to an embodied off-line creativity training program (Byrge & Tang, 2015). Taking an embodied perspective on creativity training naturally involves a mutual interaction and influence of mind, body, and world (Cowart, n.d).

Research on embodied cognition dates back to Heidegger, Merleau-Ponty, Piaget, Vygotsky and Dewey. According to Heidegger (1978), humans make sense of that which is around them and attempt to engage with it. This implies, for example, that we never merely "hear a noise" in an abstract manner.

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Rather, we hear the sound of a creaking door, thunder rumbling, or bells pealing. Whenever we hear something, we attempt to make sense of that information, and we interpret that information in the light of our experience, relevant context and circumstances. Embodied cognition "depends on the kinds of experiences that come from having a body with particular perceptual and motor capacities that are inseparably linked and that together form the matrix within which memory, emotion, language, and all other aspects of life are meshed" (Thelen, Schöner, & Smith, 2001, p. 1). This suggests a strong focus on the context and circumstances of the training for learning. For digital embodied creativity training programs this raises a question related to the transfer from digital training to "real-life" applications.

A simple search on the internet reveals hundreds of online training programs on creativity. Most of these are focused on gaining knowledge and understanding of theories, methods, processes and techniques. However, the opportunities for digital embodied creativity training are still relatively few, e.g. www.academyforcreativity.com, while some of these training programs have a primary focus on non-creative skills, e.g. www.lumosity.com and www.brainturk.com. Digital embodied creativity training systems may use gamification elements, such as badges, instant feedback on performance and a progress tracker (Werbach & Hunter, 2012), as well as avatars and virtual worlds (Brøndum et al., 2018). As such, gamification offers new opportunities for rethinking content, purpose, method of delivery and target audience in creativity training programs. Research on digital embodied creativity training is scarce, but Robbins & Kegley (2010) found a significant effect using an online creativity training based on Thinkertoys (Michalko, 2006) exercises. Hänninen et al. (2018) found significant effects on key creative skills for students using a digital embodied creativity training program for less than 10 hours. Using a mix of skin detectors and questionnaires, Núñez, Hänninen, Ramos, & Maqueda (2018) found that digital creativity training was a better learning experience than traditional equivalent offline embodied creativity training. Brøndum et al. (2018) found digital creativity training is an effective means for increasing motivation and engagement among students in out-of-class study activities. These studies suggest a positive effect and engagement, yet, they do not touch upon a key question that arises when using a digital medium for learning: does the digital aspect increase motivation for learning, or does it simply increase motivation for gaming?

The inclusion of "digital" into embodied creativity training makes the topic more complex. In the following sections, this paper evaluates the notion of digital embodied creativity training concerning potential levels of competence development as well as the related themes of motivation for and transfer of learning. Finally, the paper provides conclusions and suggests recommendations for future research.

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Levels of Competence Development

A series of stages of learning may explain the levels of competence development. The first stage is related to being a novice, such as the experience of a first driving lesson. The last stage relates to becoming a Master, such as a chess Grandmaster or a Formula 1 driver. Dreyfus (2009) provides an interesting taxonomy on stages of learning. He identified the following six stages of skill acquisition:

- Novice: the trainee gains basic information and rules about the domain.
- Advanced beginner: the trainee gains experience with the material and applies the rules within a relevant context.
- Competence: the trainee becomes more discerning due to the volume of information available and develops the ability to make decisions based on importance and relevance. At this stage, an emotional response influences the learner's decision to either progress to further stages or to give up on the process. This emotional response depends on the degree to which the learning outcome is moving smoothly and motivating the trainee.
- Proficiency: the trainee internalises knowledge gained through experience in the domain, salient features of problems are identified and the issue to be resolved is intuitively recognised.
- Expertise: the trainee can identify what needs to be achieved and knows what action to take to achieve the desired goal.
- Practical wisdom: besides being capable of intuitively resolving problems, the trainee becomes a Master who knows precisely what to do, when and how.

The Master that Dreyfus describes is similar to a concert pianist or an Olympic athlete. Acquiring a skill generally incorporates some form of progression up to the "expertise" stage. It takes a huge leap to move from Expert to Master, for example, for one to progress from running a marathon to winning an Olympic Gold Medal. The intuitive skill acquired at the top level implies that the acquisition of a skill through learning and training does not merely consist of the aggregation of bits of data. It consists of natural skill, experience and knowledge, some of which cannot be verbalised or reduced to smaller parts.

Dreyfus (2009) claims that online learning may only get the trainee as far as the first two or three stages. He suggests that embodiment is indispensable in order to progress to the third and other subsequent stages of skill acquisition. This suggestion implies that embodiment can only take place in off-line bodily presence. Dreyfus maintains that trainees need to intuitively learn skills from their Masters (or mentors) in face-to-face situations (Dreyfus 2009), and finds that this may not be possible in online environments due to anonymity, lack of

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bodily presence and lack of risk taking. Trainees need to be able to imitate the mannerisms of their masters intuitively and take note of subtle innuendoes and other cues which cannot be verbalised or reduced to a set of precise instructions. This intuitive, non-verbal communication forms an integral part of learning, according to Dreyfus, who claims that it is not possible to replicate in online environments.

There has been a great deal of criticism of Dreyfus' views on embodiment related to online learning. Starr (2001) accuses Dreyfus of raising a "mystical concern" and suggests that "the internet is not separate from the real world, it *is* part of the real world; just as the telephone is part of the real world and telephone conversations are too" (p. 13). Dall'Alba and Barnacle (2005) draw on the phenomenological tradition, on hermeneutics and the work of Ihde (2002), focussing on the relation between dichotomies such as mind and body, and human and machine. Meaning becomes possible only due to our being situated in a context where we take on a position or adopt a perspective. Due to our "being situated", "understanding is never presumption-less in that our approach to questions or problems is always informed by cultural and historical factors which influence the kinds of questions we ask and what we take to be problems" (Dall'Alba & Barnacle, p. 726). Dall'Alba and Barnacle (2005) recognise that "technologies are not merely neutral or docile tools" (p. 733) and suggest that "…technologies become an extension of us. Perceptions are embodied through instruments, artefacts and the like, from the pen and the keyboard through to complex imaging and audio devices" (p. 740). In order to understand the manner in which humans interact with technology, it is necessary to go beyond the mere notion of "users".

Following Ihde (2002), Dall'Alba and Barnacle (2005) maintain that "our engagement with technologies … is always already embodied. Moreover, body and tool, human and machine, each mediate the other, and this informs the way we understand the world and the things we do" (p. 734). It is evident that thought processes that occur while we are online, decisions taken or problems resolved online affect our thoughts and action in our real-life situations. Our real-life experiences, in turn, affect our online thought processes, decision making and problem-solving too. Petrik, Kilybayev & Shormanbayeva (2014) suggest that Dreyfus' claims on online learning are "overstated" as he "overlooks important respects in which the internet can be a valuable tool for the advancement of meaningful commitments and thus education" (p. 283). The internet, moreover, may give rise to consequences in real life as people form friendships, fall in love, get involved in political causes and engage in intellectual collaboration. These and other real-life consequences give rise to risks, according to Petrik et al. (2014). Petrik et al. (2014) suggest that the internet can support meaningful learning even though it may not cater for all educational aims. People who operate in online environments may engage in

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anonymity; however, they may also sometimes conduct themselves in the same embodied manner as they would in an off-line environment. Moreover, anonymity on the internet may be also be perceived as positive because it tends to counteract bias and prejudice that are at times evident in face-to-face learning.

Embodiment has often been eliminated from reductionist discussions on various topics including the philosophical mind-body problem that goes back to Descartes and discussions on Artificial Intelligence which sometimes adopt a reductionist perspective. Conversely, McClintock (1995) suggests that "what we call mind is simply a particular aspect of a living body in the particular social, environmental, linguistic, and historical context of its life" (p. 137). Mind in this context could be considered as equivalent to cognition or human thinking processes. Hereby, it does not seem to matter whether a cognitive process is stimulated by physical, social or technological (digital) triggers. When trainees engage in digital learning experiences, it seems that they draw upon their own personal embodied experiences. They do not leave either their body or their experiences behind. The mere training of skills that require human thinking processes may be considered a process of embodiment. Subsequently, it does not seem to matter whether this cognitive process is stimulated by physical, social or technological (digital) triggers.

Although some trainees in off-line training are fortunate to have mentors or coaches (in sports, for example), this does not apply across all disciplines. In many disciplines, people achieve levels of excellence through deliberate practice, at times on their own. Some individuals are resilient, they struggle, fail, try again and move forward slowly towards their goal. In creativity training, the level of expertise one acquires may differ. It would be unrealistic to assume that skill acquisition always leads to the creation of creative geniuses. It is reasonable to state that not everyone can achieve Dreyfus' 'Master' level. As Dreyfus' stage spectrum suggests, there may be a broad range of skill acquisition, ranging from Novice to Master. Some people may be content to remain at the level of a Novice, others may move towards becoming an advanced beginner or towards competence, while others may aim to reach higher levels in the field of their choice. Consequently, it may not make sense to discuss whether digital embodied creativity training is relevant or not, but rather how this type of training may be relevant at each stage of learning. Digital embodied creativity training seems to have obvious potential contributions for each of the first three stages; however, it may also have potential value for the latter three stages. Finally, this discussion needs to consider potential positive opportunities related to the method of delivery of the training when using digital learning programs. These include freedom from geographical boundaries, prejudices and limitations such as distance or lack of physical mobility – particularly positive opportunities for out-of-class study

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activities.

Transfer of Training

Digital simulations like Sim City or flight simulators have been used for training for many years. The transfer of the digital training to real-life flight or planning situations cannot be taken for granted. According to Boulet (2009), the digital environment must exhibit similarities to the real-life environment for the transfer of learning to occur effectively. Boulet (2009) finds that "for procedural knowledge to be effectively transferred from a virtual to a real environment, the simulated environment must reflect the real environment it models, and learning events must refer to a realistic context" (para. 20). From a meaning construction perspective, Boulet suggests that students' digital study activities should be authentic and reflect contexts similar to those of the real world. Advocates of situated cognition claim that knowledge is situated in an activity that is bound to social and cultural contexts. In other words, knowledge does not exist on its own in theoretical pure conceptual form. Knowledge comes from experience through action and focus is directed towards the importance of learning by doing and learning through mentors and coaches in real or virtual worlds. This perspective calls for situated learning, where training takes place in real life contexts. Anderson, Reder and Simon (1996) argue that situated learning "focuses on some well-documented phenomena in cognitive psychology and ignores many others" (p. 10), and they suggest that cognition may be partly context-dependent and partly context-independent. Situated cognition may be particularly useful for some training contexts, like learning to operate complicated machinery. However, the concept may be less useful for other training contexts such as improving skills related to sports, music or speed typing. If one were to practice speed typing on a keyboard, writing about food recipes using Microsoft Word, it is likely that this acquired skill can also be used when writing about a holiday using the Apple Mail application. If one were to practice running with a ball in football, it is likely that this acquired skill can also be used when running to catch a bus.

The experience which human beings draw upon when they employ their cognitive processes originates from their body through their sensory perception and from the environment which provides them with those experiences. If thinking were to occur in a non-embodied environment, it would be similar to the proverbial brain in a vat (Dennett, 1981), keeping in mind the fact that thought, judgement and action are based on an accumulation of real-life experiences. Moreover, some digital and online training programs include strategies for the transfer of skills from the online environment into real life. One example of this is war game simulation (Rubel, 2006), where participants experiment with strategies and where the consequences of online training provide learning experiences for those involved. The same argument could be applied to virtual flight and medical

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simulations.

It is doubtful whether anyone would claim that humans are disembodied when using the phone, reading a book, watching TV or listening to the radio. These interfaces may be comparable to digital training, particularly concerning information, learning and exploring. Humans establish a relationship with these "interfaces", and as a result, they enable the possibility of moving beyond conventional real-world boundaries. As Petrik et al. (2014) claim, "the Net can support and enhance meaningful interpersonal relationships and, consequently, meaningful learning" (p. 278).

McGonigal (2010) finds that gamers engage in epic adventures where they are challenged to use their skills to survive. This allows for the possibility of the transfer of habits and skills to the real world. As McGonigal states: "nobody wants to change how they live just because it's good for the world, or because we're supposed to" and, interestingly, the research she conducted demonstrates that most "players have kept up the habits that they learned in this game" (para. 29). This is precisely what online embodied creativity training should expect to achieve. It may be that digital embodied creativity training should do its best to reflect situations that learners may easily recognise and can easily relate to in their real-life situations in order to increase the possibility of high levels of transfer effect.

Motivation for Gaming and Learning

Gamification today is often described as the use of game mechanics in non-game contexts, making use of game features in an attempt to support learning and make it more engaging. According to Boulet (2016) "game mechanics are tools used by game designers to add a structure that complements and enhances the content of the game. These mechanics often take the form of a virtual reward system that can include: points, badges, levels, virtual currencies, etc." (para. 6). Gamification techniques were introduced long before the advent of computers and online gaming platforms. Collecting coupons and exchanging them for prizes or obtaining points depending on the amount of money spent are examples of rewards related to gamification that have existed for some time. Loyalty programs are another example of gamification methods and techniques. As such, any creativity teacher may be able to induce gamification into off-line embodied creativity training.

Digital technologies available for online training have evolved a great deal during the past decades. Besides text, audio and video, the current online learning environment includes virtual worlds and games which may be used either by individuals or by groups of people dispersed geographically all over the world. Research conducted on virtual worlds claims that "students often do not distinguish between themselves and their avatars; the boundaries

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between the real and virtual environments are highly (cognitively) permeable" (Pasfield-Neofito, Huang, & Grant, 2015, p. 710). There are several other examples of the manner in which personal identity overcomes the alleged distance between an individual and a digital environment (e.g. Clinton, 2006; Soares 2008), and where online game players project themselves on to their avatar (Turkle, 1984). This shows that students may be capable of moving easily between a real-world study activity and a virtual world study activity and between their real-life selves and their avatars, reinforcing the relationship that persons have with the online environments in which they operate.

McGonigal (2013) suggests that "games change how we feel, think, act, and relate to each other even during the hours we're not gaming" (para. 6) and that they can motivate gamers to solve problems, collaborate and cooperate. Resilience may be a skill which is acquired through online gaming as gamers are challenged and motivated to approach failure and to problem-solve differently from how they may do so in the real world. Gamers are challenged to overcome failure and to achieve success with their efforts, rather than become anxious, cynical and frustrated, as sometimes happens in off-line (real-world) study activities. McGonigal stresses the collaborative aspect of online multiplayer games where new entrants find other gamers ready to offer support, advice and feedback, this being something which is not as easily available in real-life off-line study activities, in particular those out-of-class study activities.

Boulet (2016) offers a more critical perspective on the digitalisation of training. He finds that "gamification may make learning content more engaging, at least for a while, but it doesn't make it more relevant or effective" (Boulet, 2016, para. 25). He further argues that learning that requires "bells and whistles" to be motivating may incorporate boring content, and it is this content that should be addressed. Boulet (2016) rejects the idea that simply adding extrinsic incentives, like points, levels or badges, should foster students' engagement towards learning activities and he claims that it is "clear that having fun learning does not increase the intrinsic motivation to learn (para. 18). In contrast, McGonigal (2010) claims that gaming provides young people with a "parallel track of education" as young people learn what it means to be a "good gamer", suggesting that gamification incorporates a positive general learning element in itself. These may at first seem like two opposite perspectives on the relevance of digitalisation and gamification elements for motivation and learning. However, the synthesis may imply that one should be careful in the digital translation of off-line creativity training material. A digitalisation of "boring" off-line creativity training materials may lead to more training being performed, but it may not lead to motivation for additional training after the digital embodied creativity training program is over. Regarding in-class motivation, the digitalisation may not enhance motivation

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more than what off-line gamification of creativity training may offer. However, for out-of-class study activity, digital embodied creativity training may offer a novel and valuable approach to sustain motivation, at least for the duration of the training program.

Conclusion and discussion

This paper has evaluated the notion of digital embodied creativity training concerning the level of competence development and the related themes of motivation for and transfer of learning. It claims that the digitalisation of embodied creativity training is relevant, both from the perspective of competence development, motivation and for transfer of learning.

From a competency perspective, it does not make sense to discuss whether digital embodied creativity training is possible or not. Rather, it makes sense to discuss how this type of training may be useful at each stage of learning. This appears to fit naturally in the acquisition of fundamental skills. Some skills may be easily acquired through digital training, while others may be easier to acquire in face-to-face training settings. Having a master-apprentice learning opportunity may be ideal for reaching the highest stages of learning, at least for some aspects of learning. Therefore, digital embodied creativity training may not support all educational aims right now. However, Starr (2001) predicts that better technology may eventually support the teacher-student relationship in ways that may be unimaginable for us today. Possibly, in the near future, new kinds of digital embodied creativity training programs that offer meaningful learning at all stages in most aspects of learning may emerge, and training and educational institutions should prepare and innovate for this eventuality.

Digital training provides opportunities for anonymity and it allows trainees to reject engagement that requires risks, but the gamification possibilities of digital training programs may also have the potential to increase personal engagement to an extent far beyond what is expected from traditional off-line training programs. This may be particularly true for out-of-class study activities, where student disengagement is a general problem (Betihavas, Bridgman, Kornhaber, & Cross, 2016). Anonymity and easy avoidance of risk may even give rise to new dimensions of training not yet seen in classroom settings. Trainees may potentially develop an approach to training where they may dare more because of the anonymity and they may increase their engagement in spite of the risks, simply by adopting a “gamer” attitude when handling the risks. This particular behaviour may prove effective for trainees who have low levels of self-efficacy. Digital embodied creativity training, moreover, offers new opportunities for skill acquisition through distance learning, opening up new opportunities for all, including those who may be at a physical or geographical disadvantage.

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It seems that digital training should not be considered very different from off-line learning "interfaces" like workbooks, books, written assignments and social interaction. However, it does seem best that the digital training environment reflects situations that trainees may easily relate to their real-life situations. Digital training automatically brings into play the previous experiences and knowledge gained outside the digital training. Likewise, the digital training adds new experiences and knowledge to the collective sum of experiences and knowledge of the trainee. The transfer effect for digital embodied creativity training may not be very different from the transfer effect for off-line embodied creativity training. Also, as more time in work and private life is spent online, it is relevant to challenge off-line training systems. Keeping in mind the notion of situated cognition, it may be that the transfer effect from digital embodied creativity training to "digital social and work life" may be higher than the transfer effect from off-line embodied creativity training, and vice versa.

From a motivation perspective, it is important to be cautious about bold, direct translations from off-line embodied creativity training to digital embodied creativity training. The digital translation itself may not increase motivation for learning in itself. Instead, it opens up new possibilities to add alternative motivation parameters through gaming. An investment in digitalisation should not replace investments in developing the training itself. Nevertheless, the digitalisation may increase motivation for performing well in the training program.

The discussion in this paper has its limitations, mainly because it is based on conceptual evaluation as it brings together various topics and elicits results based on the inductive approach adopted. It is, therefore, necessary to further study and experiment with digital embodied creativity training as part of educational programs or organisational development. The findings in this paper call specifically for further studies on the relationship between digital embodied creativity training and levels of learning: at which levels does it contribute positively to skills acquisition and how? How is knowledge transferred from these digital embodied creativity training programs to real-life situations where creativity as a skill is needed? These situations may be physical, cognitive, or social. Finally, the findings call for further studies to create an understanding of why and how "motivation for becoming more creative" may be affected by this kind of training. This is especially interesting in out-of-class training, either as part of formal education or for personal development perspectives.

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