

**WeKnow, an online community for tweens
as a social system for creativity**

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INTRODUCTION

This research explores how WeKnow, an online peer-learning community for tweens, can enhance creativity through social interactions among its young users. WeKnow is an informal online learning environment for children to share videos about their passions, knowledge, and skills. The platform aims to engage learners as content producers, shifting tweens' media-use from consumers to creators of media. Participatory creation in technological media has been highlighted by educational research as a key digital literacy for the 21st Century (Resnick, 2001; Jenkins, 2006) and WeKnow aims to facilitate the enhancement of creativity by fostering social interactions that may stimulate this skill. This study seeks to understand creativity from a social perspective (Csikszentmihalyi, 1996; Amabile, 20) and defines it as the generation of ideas or products that are novel, effective, and attractive for a particular social context. This means that in WeKnow, a creative product will be a video representation of something that is original, useful, and attractive as defined by the community of tweens that are the users of the platform. This research aims to understand how creativity could be enhanced using the framework System Model for Creativity (Csikszentmihalyi, 1996) to explain the role of the socio-cultural context in children's creative endeavors in digital communities. The research combines an analysis of design features with observations of users interacting with the app to identify and describe the elements of the system and characteristics that may stimulate or hinder creativity. As a result, the study provides theoretical insights on how creativity happens in online learning communities for tweens and offers design principles that may promote creativity in digital communities.

1. Background of the study

1.1. We know, a peer-learning online community for tweens

WeKnow is a peer-learning online environment for tweens to share videos about their interests, passions, knowledge, and skills. The platform aims to support informal learning (where learners set their goals and standards of achievement) and constructionism (where learners build understanding through the creation of personally meaningful artifacts). The main purpose of the platform is to engage learners as content creators while shifting the identity of tweens from consumers to producers of media. The project is based on current tweens' socio-cultural dynamics with technology and it is informed by their communities and tools used to share content. WeKnow aims to address the gap in user-driven platforms for tweens by creating a community created *by* learners *for* learners.

The prototype of WeKnow that was used in this research can be found in this [link](#) and further information could be find on this [design document](#).

1.2. Tweens, WeKnow's target audience

WeKnow is targeted at upper elementary and middle school-aged learners (8-14 years old). Tween is a recent word that describes youths who are roughly ages 8-14, who are between childhood and the teenage years (the term “tween” is a blend of the words “between” and “teen”). According to Erikson’s stages of psychosocial development, children this age are in a stage of Competence vs. Inferiority. These learners have acquired important skills such as reading, writing, and arithmetic, and have also developed fine motor and athletic skills, making them feel competent. However, when they compare themselves to an adult, they may

feel inferior in skills, size, and authority. Tweens are building foundations for adolescence, where they will go through the stage of Identity vs. Identity Confusion. During this stage, children are starting to form their own identity as individuals, but it is also a period of confusion and exploration. Adolescents are facing the challenge of becoming a unique person and experience confusion about who they are (Smith & Ragan, 2005).

Tweens are in a phase of rapid and important development in all areas. They are acquiring new skills and feel the need to become more independent, make their own decisions, and be altogether more autonomous. Additionally, they are exploring and building their identity, but feel confusion and doubts throughout this process. The implication of this for WeKnow is that providing tweens with the opportunity to showcase and share their talents, interests, and skills may satisfy their need to take the initiative and do things on their own. Positioning learners as experts may empower them by providing opportunities to exercise and enhance their skills while exploring their identities. Content creation plays a great deal in identity development and it will reinforce their roles as creators and contributors within a community of peers.

2. Literature review

2.1. Context: individual, social, and educational perspectives on creativity

Creativity has always been a driving force in the development of our species. Language, values, artistic expression, scientific understanding, and technology are all the result of human creativity. In a similar way, the future and prosperity of humanity is closely tied to our ability to respond creatively to new challenges. In the last decade, creativity has gained renewed attention as educational, political, and economic publications have pointed it out as a critical skill to be successful in our century. Researchers from multiple areas have

emphasize this need based on the role creativity plays in human development from both individual and social perspectives.

On an individual or personal level, creativity offers unique possibilities for human empowerment, personal satisfaction and sense of fulfillment (Newton & Newton, 2014). Research has shown that when an individual is involved in creative work, his or her life seems fuller than without engaging in a creative process (Csikszentmihalyi, 1996). Creative people find joy in a job well done and feel that learning for its own sake is rewarding even if it fails or is not recognized (Csikszentmihalyi, 1996). Furthermore, in a world driven by change, creativity and innovation are essential for professional growth and security in the workplace. Friedman (2007), argues that those with the ability to imagine new services, new opportunities, the smartest ways to do old jobs, and new ways to combine technology will thrive. Creativity is also behind new discoveries in medicine, physics, mathematics and other sciences through the ability to see new patterns or connect ideas. Creativity is also what fuels the visual arts, music, literature, dance, and other forms of expression that we most often correlate with this skill. This way creativity is widely distributed among multiple domains and therefore can be achieved by everyone. Robinson and Aronica (2009) explain that creativity is enhanced when people are working embedded in their *element*, which is the meeting point between natural aptitude and personal passion. According to the authors, finding your element is essential to your well-being and, ultimately, your success as you can find meaning and purpose in and beyond whatever work you do (Robinson & Aronica).

From a social perspective, creativity has become a primary concern in the political, educational, and economic agendas of many countries. Research studies, official reports, and government publications have identified creativity as a crucial skill needed to solve pressing contemporary challenges (Newton & Newton, 2014). From an economic perspective

globalization and technology have increased competition among organizations and the ability to innovate and adapt to changes is necessary to thrive (Newton & Newton, 2014). This economical need and other factors have fueled the interest in creativity in the educational field as well.

From an educational perspective, creativity has gained increased attention as an essential literacy for the 21st century. Creativity is now considered a higher-order learning goal as it is possible to see in Krathwohl (2002) revised version of the Bloom's Taxonomy (see figure 1). This framework aims to classify in a hierarchy the different types and levels of knowledge. The author places creativity at the top level, recognizing it as a higher-level thinking skill that should be considered the most important outcome of education. As a learning goal, *understanding through creative work* implies learners should be able to put elements together to form a coherent, functional, and new whole.

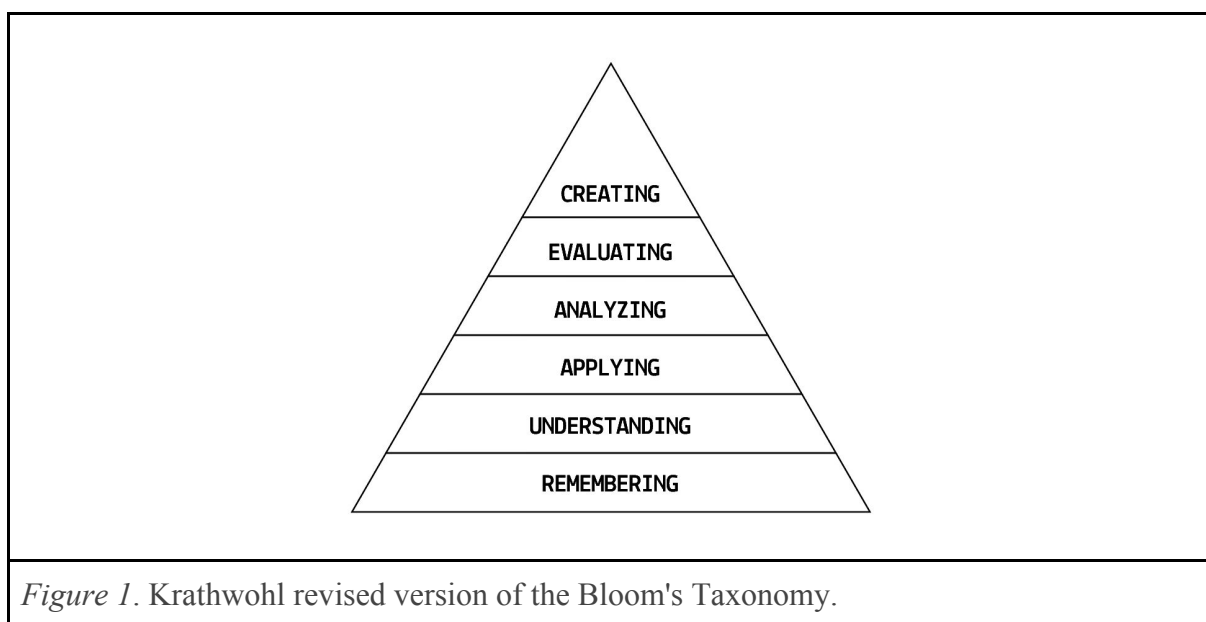


Figure 1. Krathwohl revised version of the Bloom's Taxonomy.

Educational research in creativity have also demystified the popular view that creativity is reserved for special people by instead emphasizing that everyone has the

potential to be creative in their everyday life (Runco, 2004; Robinson & Aronica, 2009; Newton & Newton, 2014; Sternberg, Grigorenko, & Singer, 2004). Likewise, creativity should also be considered a function of every discipline, rejecting existing misconceptions that associate creativity exclusively with the arts (Fryer, 2016, as cited in Newton & Newton, 2014). Educators can foster creativity throughout the curriculum and provide opportunities to stimulate this skill in all learners. For instance, through encouraging learning to solve problems for themselves, rather than giving them the answers in mathematics or science.

For the above mentioned reasons, we need to provide young people with opportunities to become creative individuals to solve the challenges we are facing as a society and to thrive and live fuller lives. WeKnow, as a peer learning online community, aims to help children to connect with their unique talents and passions within a wider range of domains and provide the space and support for creative development in personally meaningful ways.

2.2. Defining creativity

While the idea of creativity is popular in research, there is a lack of clear understanding of its meaning (Plucker, Beghetto, & Dow, 2004; Koehler & Mishra, 2008). Different terms and definitions are used interchangeably to refer to creativity resulting in both conceptual confusion and conceptual overlap. For this reason, this section clarify the concept and define the meaning that will be used in this research.

Robinson (2017) differentiates among imagination, creativity and innovation in that imagination is the ability to bring to mind ideas and events that are not present to our senses; creativity is the ability to generate original ideas that have value; and innovation is putting original ideas into practice. The author argues that a culture of innovation depends on cultivating the three processes (Robinson, 2017).

In a similar way, several authors agree that creativity can be described as the production of solutions that are both novel and useful (Amabile, 1988; Amabile, T. M., Conti, R., Coon, H., Lazenby, J., & Herron, M., 1996; Henriksen, Mishra, & Mehta, 2015). A novel idea brings something new or original into the world. Other terms referred to describe novelty are unique, fresh, pioneering, trendsetting, and unusual (Henriksen et al., 2015). A novel idea is something that does not exist before, at least in that particular context. For instance, the light bulb was something new for the American society when Thomas Edison created it in the early 1880s.

But being novel is not enough for something to be considered creative. Novel ideas need also to be effective and/or useful for a particular purpose in order to be considered creative. Other words used to describe this attribute are valuable, significant, appropriate, and functional (Henriksen et al., 2015). For instance, the light bulb can be considered a creative product because in addition to being something new it proved to be an effective way of providing light to society.

In addition to novel and useful attributes, some authors have considered wholeness to be a third essential component (Henriksen et al., 2015). The argument is that creative products are sensitive to contexts in their aesthetic and stylistic qualities. Wholeness is the aesthetic dimension of a novel and useful product that makes it appealing for the domain in which it was created (Henriksen et al.). In other words, wholeness means to be attractive, interesting, and well-made for a particular context. Following the same example, in a country lighted by candles and oil lamps, the light bulb of Edison was not only a novel and useful solution but also an attractive one due to its brightness, simplicity, transparency, and cleanness.

The attributes of novelty, usefulness, and wholeness define what is considered creative for a particular context but, what is the role that the context plays in this selective process? Research on socio-cultural perspectives on creativity have explored the role of the context by shifting the attention from *what* is creativity to *where* is creativity (Amabile, 2017; Csikszentmihalyi, 1996) . From a socio-cultural perspective Csikszentmihalyi (1996) defines creativity as "any act, idea, or product that changes an existing domain, or that transforms an existing domain into a new one" (p.86). This perspective, that will be further analyzed in the next section, emphasizes the social aspect of creativity in that in order for an idea to be considered creative there must be an audience to assess it. Csikszentmihalyi (1996) argues that a creative work could not be separated from its socio-cultural context. For instance, the success of Edison light bulb is largely due to the historical context in which it was created. The country was in full industrial revolution and the light bulb helped transform America from an agricultural nation into an industrial world power.

Building on each of the above-mentioned perspectives, for the purpose of this study we will define that a creative product is a novel, useful, and attractive solution as defined within a particular socio-cultural context (see figure 2). More specifically, in the context of WeKnow, a creative product will be a video representation of something that is original, useful, and attractive as defined by the community of tweens that are the users of the platform.

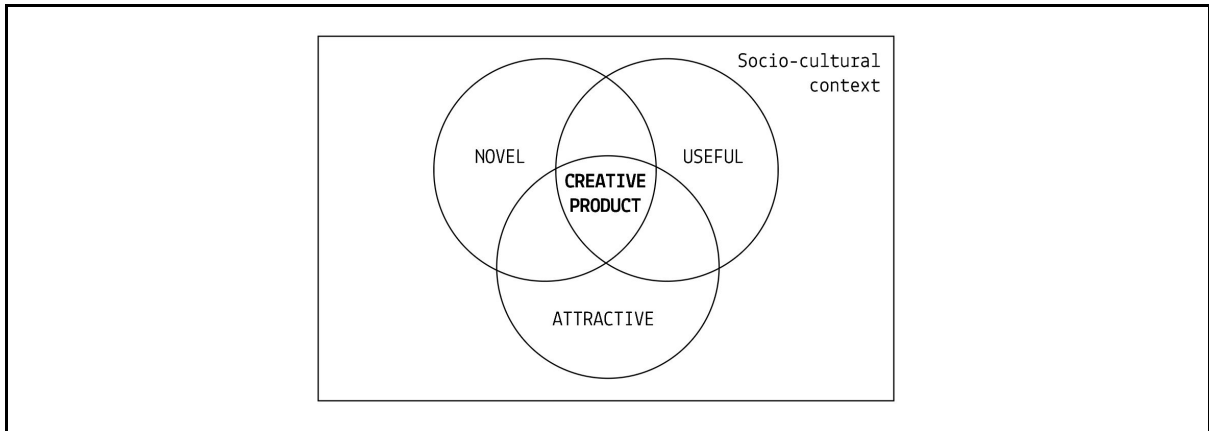
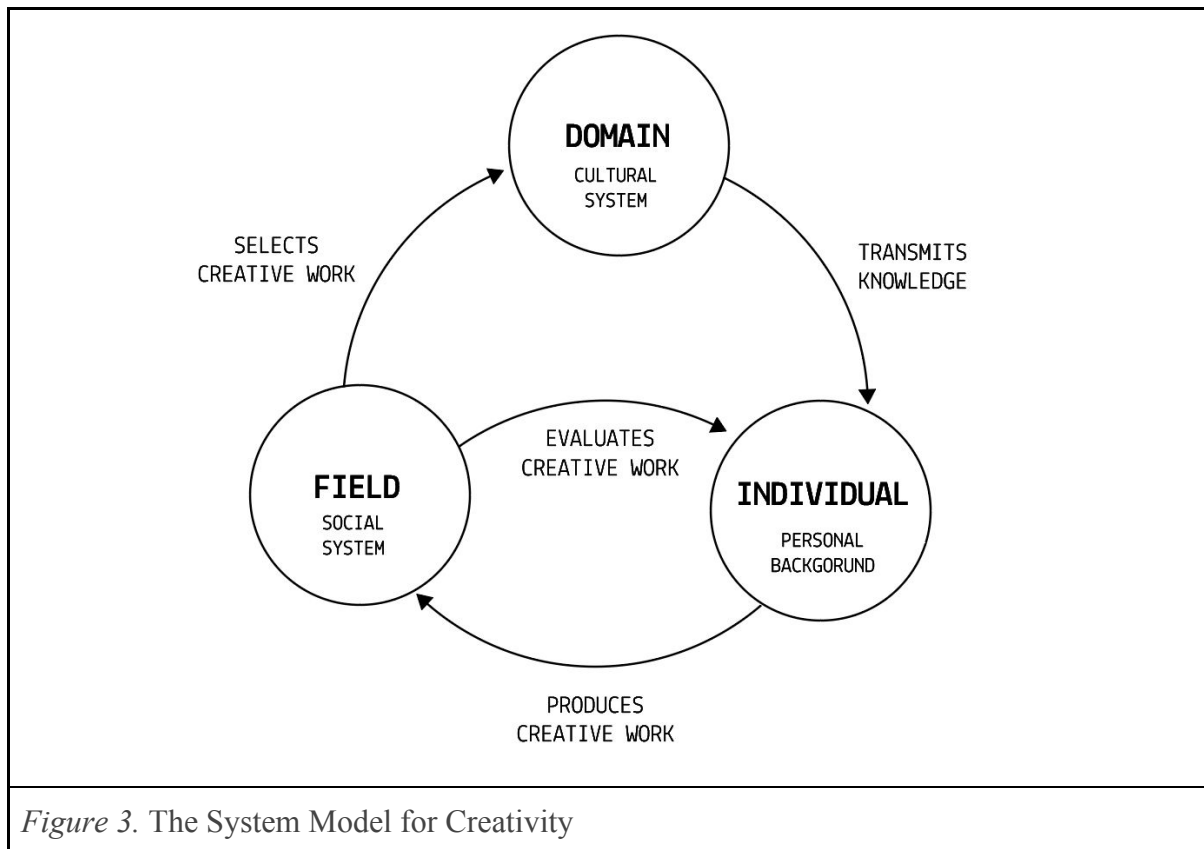


Figure 2. Venn diagram representing the definition of a creative product as a novel, useful, and attractive solution for a particular socio-cultural context

2.4. The System Model for Creativity: A socio-cultural perspective on creativity

The psychologist Mihaly Csikszentmihalyi had largely explored creativity as a socio-cultural event. He argues that "an idea that deserves the label creative arises from the synergy of many sources and not only from the mind of a single person. [...] It is easier to enhance creativity by changing conditions in the environment than by trying to make people think more creatively" (1996, p.1). According to this view, a creative idea vanishes if there is no receptive audience to assess it. To illustrate the role of the audience and the context in the development of creativity, Csikszentmihalyi (1996) proposes the System Model for Creativity depicted in figure 3. This model explains that creativity arises from a dynamic composed of three elements: a domain or culture that contains symbolic rules, a person who brings novelty into the domain, and a field of experts who recognize and validate the innovation.



First, the domain consists of the set of symbolic rules, procedures, cultural values, tools, and knowledge (Csikszentmihalyi, 1996). The visual arts, mathematics, dance, biology are all different domains with particular cultures, rules, and knowledge. According to Csikszentmihalyi (1996) "a person cannot contribute innovation to a domain to which he or she has not been exposed" (p. 29). For instance, no matter how much talent and skill a girl may have for music, she can never contribute to the music domain if she is not exposed to the knowledge, instruments, notation, and rules of music.

Second, the field is the social aspect of a given domain. It consists of the community of practice or the individuals that act as gatekeepers of the discipline; they decide whether an idea or product should be included in the domain (Csikszentmihalyi, 1996). For instance, in the visual arts, the teachers, curators of museums, or critiques are the field of that domain. Other fields are less defined and could be as large as the domain itself. Csikszentmihalyi

(1996) argues that in order for an idea/product to be considered creative it must be socially validated as such. For example, for McDonalds to introduce the idea of fast-food in the food industry, it was necessary for the idea to be largely adopted by consumers who acted as the field of this domain.

Third, the individual is any person within the described socio-cultural environment. Creativity occurs when a person using the symbols of a domain has a new idea or sees a new pattern which is selected by the appropriate field for inclusion into the domain (Csikszentmihalyi, 1996). For instance, Steve Jobs, in order to create the iPhone, used the symbols, knowledge, and tools from the technological and communications domains to see a new pattern in the way people communicates. Nevertheless, his idea would not be considered creative if it was not largely adopted by users what in turn revolutionized the communications and technological domains. According to this perspective, anyone can potentially be a creative person because what counts is whether the novelty that the individual produces is accepted by the field which may be the result of chance, perseverance, or being at the right time at the right place (Csikszentmihalyi, 1996). As a consequence, Csikszentmihalyi (1996) argues that the personal trait of creativity described by psychology is, for this reason, neither sufficient nor a necessary condition for it.

This socio-cultural perspective argues that creativity happens in the interaction between the domain, the field, and individuals. This perspective highlights the relevance of environments that promote the interaction between these three components. Following that line of thought, the assumption of this study is that online social communities provide renewed opportunities for interaction among the domain, the field, and the individuals to enhance creative development.

2.3. Dimensions of creativity

In addition to the attributes (novel, usefulness, and wholeness) that define creative products for a particular socio-cultural context, other authors have differentiated levels in which creative work can be classified. Kaufman and Beghetto (2009) propose a model of creativity that offers distinction between four levels of creativity: Big-C, Pro-c, little-c, and mini-c. The following review of the different levels will allow us to specify which level of creativity WeKnow aims to foster and focus the scope of our research.

The first level of the model is *Big-C* creativity and refers to the generation of ideas, acts, or products that changes a domain in the long term. Research on this level frequently focuses on the study of creative geniuses whose works have been recognized and have lasted for generations (Gardner, 2011; Gladwell, 2008). Csikszentmihalyi's social perspective on creativity addressed such creative endeavors through the lens of the System Model of Creativity. He and other authors highlighted the importance of required expertise needed to master a discipline before making creative contributions (Csikszentmihalyi, 1996; Simonton, 1994; Gardner, 2011; Gladwell, 2008). At the Big-C level, the focus is put on understanding how the creator has impacted the field and influenced future generations rather than discussing the originality of the creation (Kaufman & Beghetto, 2009).

In a second level, Pro-c creativity focuses on the creative work of those who attain a professional-level of expertise but that has not yet attained Big-C status. Evidence has shown that prominent creators require at least ten years of experience to eventually reach eminence but that journey can be filled with creative practice that it is worth studying (Blooms, 1985; Hayes, 1989; Gardner, 1993; Kaufman & Kaufman, 2007; Simonton, 2000; as cited in Kaufman & Beghetto, 2009). Research on this level aims to recognize the exploration and experimentation that may occur during practice and expertise acquisition. For instance, the

creative work of an academic who makes a living writing original papers but has not yet attained (or may never attain) Big-C status.

In a third level, little-c creativity focuses on creative actions in which the non-expert may engage in their daily life. Research on this area highlights that everyone can potentially be creative (Runco, 2004; Robinson & Aronica, 2009; Newton & Newton, 2014; Sternberg, Grigorenko, & Singer, 2004). Studies tend to focus on psychological characteristics and their correlation with creativity such as unconventionality, inquisitiveness, imagination, freedom, tolerance for ambiguity, self-discipline and willingness to take risk (Sternberg, 1985; as cited in Kaufman & Beghetto, 2009; Amabile, 1996). In addition to those personal factors, Amabile (1996) also highlighted the importance of intrinsic motivation. In her studies, she demonstrated that people driven by enjoyment and passion tend to be more creative than those motivated by money, praise, or grades (Amabile, 1996). The transition from little-c to Pro-c often occurs through informal apprenticeship such as working with an older or more experienced colleague or mentor. It can also occur through personal motivation and the desire to explore and express.

Finally, the fourth level, mini-c creativity refers to the "novel and personally meaningful interpretation of experiences, actions and events" (Kaufman & Beghetto, 2009, p.3). This area studies, for instance, the creative insights or interpretations students may have in class even if he or she is not yet able to articulate those thoughts. This way, research aims to recognize the value of creativity inside people's minds and understand the genesis and incipient development of creative ideas.

For the purpose of this study, we will focus on little-c creativity as a way to explain the creative approaches of tweens in WeKnow. This app aims to be an environment where non-experts can enhance their creativity by demonstrating, practicing, and sharing their

interests and talents within a variety of domains. As an informal learning environment, the app aims to enhance tweens intrinsic motivation to learn and develop their interests in creative ways. The platform, as a peer-learning community, aims to facilitate children to contact and interaction with more experienced peers. This may facilitate their transition into Pro-c creativity as they gain experience and reference for improvement. This research will focus on the understanding of tweens little-c creative development in WeKnow, with a special focus on the role that the design plays in generating the digital and social interactions for creativity to happen.

2.5. Creativity and technology

Henriksen and colleagues (2016) noted that the System Model for Creativity can be enhanced through technology by fostering interactions among the domain, the individual and the field. The argument is that technology can promote knowledge construction and knowledge sharing within wider communities, which in turn may facilitate its recognition by the field (Henriksen et al., 2016). From this perspective, technology can play an important role in the social construction of creativity because "one of the key affordances of digital technologies is that content or knowledge can be created, shared, and discovered much more quickly and easily" (Henriksen et al., 2016, p. 31).

According to Amabile (2017), "increasingly, technology is enabling open innovation, user innovation, and citizen innovation. It seems [...] likely that products and services resulting from the creative behaviour of ordinary individuals may not only become more prevalent than those coming from experts or geniuses in particular domains, it may actually become the most important source of creative breakthroughs" (p.5). In other words, technology and specifically the internet has become an auspicious environment for creative

development as it allows ordinary individuals to enhance creativity and generate open innovation.

Jordan and Carlile (2012) explain that technology and specially the internet is particularly valuable at enhancing little-c creativity as it can support the expression of individuals by providing easy ways to transform ideas into reality. Furthermore, technology can complement skills by providing the means of experimentation and exploration (Jordan & Carlile, 2012). For instance, for an aspirant artist a digital illustration software may facilitate experimentation and exploration by providing easy ways to mix color, make visual effects, and mix-and-match graphic content.

In addition to facilitating the creation process, technology allow us to share content with broader audiences in ways never experienced before the era of the internet. This idea is evidenced by the increasing number of digital technologies for content development, remixing, and sharing, as well as new communities for the crowdsourcing of resources and ideas. Examples of these technologies are YouTube, Pinterest, Instagram, Vimeo, Scratch, and SoundCloud. Digital technologies allow people to express themselves in new ways and to make original and valuable contributions to larger communities (Loveless, 2003).

Due to the afore-mentioned explorative affordances, technology—as a tool for creation—has gained attention in the educational field. In the last decades, digital literacies have been defined to guide the inclusion of technology in schools and delineate which skills are expected for learners to enhance when using technology. Resnik (2001) argues that in our digital age, "being digitally fluent means not only knowing how to use digital technology, but also knowing how to create things of significance with it". Jenkins (2006) stretches the idea of participatory creation, where a person who is digitally literate goes beyond consuming information to engage in the creation of digital information. In other words being digitally

literate implies more than being solely a user of a technology, it means being an actor or influencer whose tools happen to be digital (Meyers, Erickson, & Small, 2013). This participatory discourse around digital media, emphasize the underlying norms and practices needed to operate collectively as digital citizens. Giving attribution, respecting privacy, being aware of the intentions and feelings of fellow digital citizens, are all digital literacies needed for children to participate safely as creators within digital communities (Meyers et al., 2013).

For these reasons, it is important to broaden our understanding of how children's practices of everyday creativity occurs in online communities. This may help guide the design of renewed digital tools needed to enhance children participation as active creators and collaborators using technology.

METHODOLOGY

The study was designed to improve our understanding on how creativity can be enhanced in WeKnow, an informal peer-learning online community for tweens. The research uses the System Model of Creativity as a framework of analysis. Using this model, this qualitative study analyzes the domain, the individuals, and the field through a design analysis of the platform and through observations of tweens interacting with the app.

3. Problem Statement

3.1. Identified gap in research

Technology and, specifically, online communities, are now playing a significant role in the generation of open innovation as they provide the space for users to learn from each other within authentic communities of practice. As described in the Creativity and Technology section, children are expected to develop digital literacies and are increasingly

encouraged to participate in technological environments as active contributors and creators. As previously explained, the social context plays a fundamental role in creative development and online communities can be influential social environments for children. Research is required to understand how creativity is enhanced in such digital context by analyzing the social interactions that promote the active participation of young users as creators.

Studies on social creativity have been conducted in communities to explain scientific, technological, and artistic innovation (Baer & McKool, 2009; Csikszentmihalyi, 2016; Csikszentmihalyi & Getzels, 2014). Similarly, research has also explored how creativity can be boosted in the workplace (Amabile, Conti, Coon, Lazenby, & Herron, 1996) and also in schools (Newton & Newton, 2014; Henriksen et al., 2016). The focus on such studies has been, more than in the personality of creative people, in recognizing the role of collaborators and the socio-cultural context for creative achievement. The System Model for Creativity stands out as a comprehensive way to explain how socio-cultural factors can enhance creativity (Davis, 2013). This model explains that creativity happens in the interaction between the components of that system: the individual, including personality, background and influences; the domain, knowledge and rules of a discipline area in which they have worked; and the field, the evaluators, collaborators and colleagues of the domain. Despite the effectiveness of the System Model for Creativity to explain creativity in a variety of context and audiences, little research has been conducted to understand how this model can be used to explain the role of the socio-cultural context in children's creative endeavors in online communities.

The System Model for Creativity has mostly been used to describe Big-C creativity as Csikszentmihalyi (1996) reinforces the idea that for a work to be considered creative it must be accepted for inclusion in the domain. He argues that children cannot be creative because

creativity implies changing a way of doing things and that requires having mastered the old ways of doing things. His argument is made based on narrowing the meaning of creativity only to a Big-C level focusing on the creative work of geniuses and eminences. Nevertheless, as exposed in the Dimensions of Creativity section, there are multiple levels of creativity, and the creative work and incipient ideas of normal people in their everyday life needs to be recognized and studied as well. Personally or socially meaningful actions can be recognized as creative endeavors as they contribute with novel, effective and attractive ideas for a specific socio-cultural contexts. In this way, children can be creative as they are constantly trying new ways of doing things that can be unique, effective, and attractive for their peers, teachers, or family. This study aims to analyze little-c creativity in tweens using the System Model for Creativity to understand the role of the online socio-cultural context in the generation of creative ideas and digital products.

3.2. Goal of the study

This study aims to extend the application of the System Model of Creativity to a new level, by exploring little-c creativity on tweens, and to a new contextual dimension by exploring informal peer-learning online environments as a social context. The objective is to gain theoretical insights on how creativity happens in online learning communities for tweens and obtain design principles for the app to be improved in order to facilitate an environment where innovation is encouraged.

3.3. Research question

The overarching question to be explored is how WeKnow, as an informal peer-learning online environment for tweens, can enhance creativity in children by supporting the interaction among the elements of the System Model of Creativity (domain, field, and

individuals) through specific design features. This implies understanding the following sub-questions:

- 1) How are different domains supported by WeKnow, thus allowing users to gain knowledge, cultural values, ideas, and skills from each other?
- 2) How are the individuals supported by WeKnow, allowing them express creatively in their domains of interest?
- 3) How is the field supported by WeKnow by allowing tweens to act as evaluators of their peers' creative work?

4. Theoretical Framework

Several authors have identified common characteristics of individuals, domains, and fields that correlate with creative development (Csikszentmihalyi, 1996; Jordan & Carlile, 2012; Davis, 2013; Simonton, 1994; Amabile, 2017; Collins & Amabile, 1999; Gardner, 2011). These characteristics are summarized and depicted in figure 4, and this extension of the System Model for Creativity will constitute the framework or rubric of analysis for each of the three elements of the system.

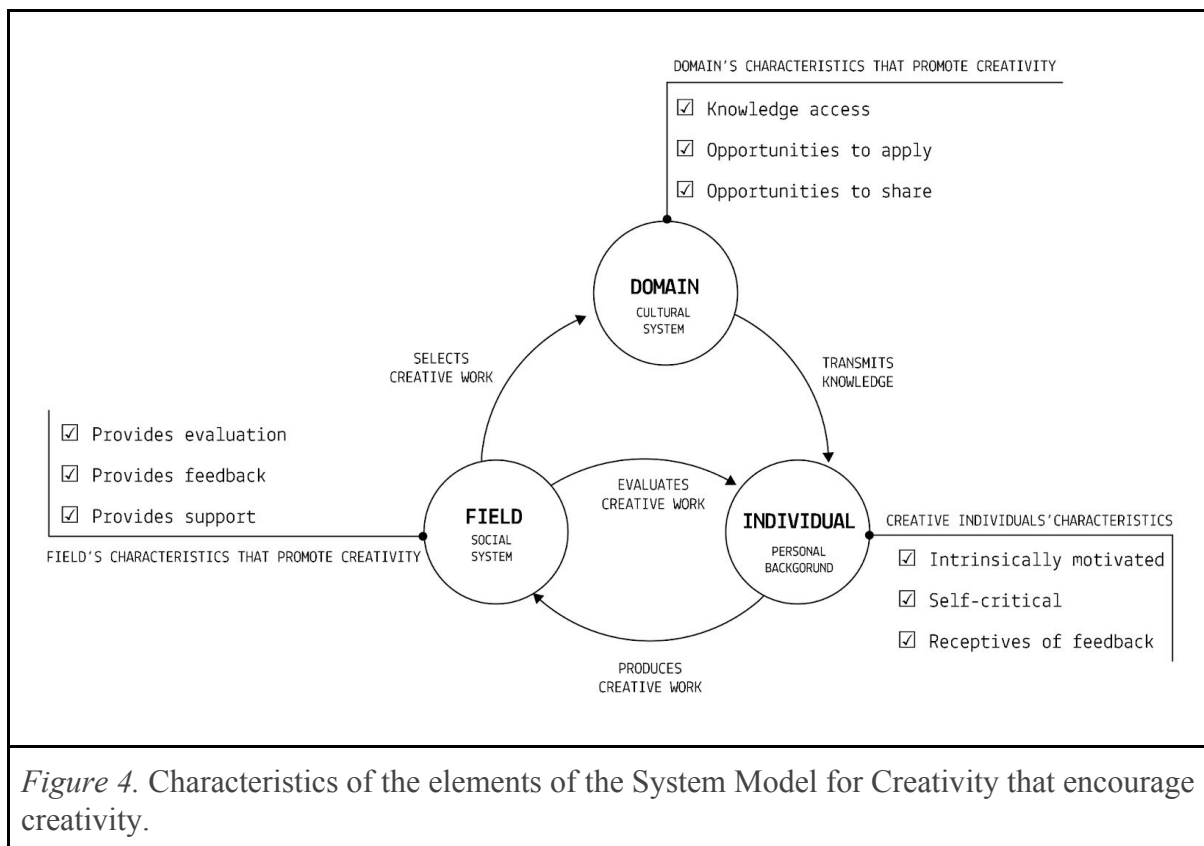


Figure 4. Characteristics of the elements of the System Model for Creativity that encourage creativity.

4.1. Characteristics of domains that encourage creativity

Domains that encourage creativity tend to offer:

- a) **Knowledge access:** Open access to the knowledge of a domain allows individuals to absorb information, assimilate rules quickly, apply through practice, and eventually master and find ways to make creative contributions (Csikszentmihalyi, 1996). For instance, quantum physics represents a domain which knowledge is hard to access as its rules are difficult to comprehend and its principles are hard to apply. In contrast, literature is a domain easier to access, as libraries and the internet provide access to knowledge and text editor softwares may facilitate practice.
- b) **Opportunities to apply:** Being able to apply, practice, explore, extend, and combine implies making knowledge and skills actionable by using them in new situations (Krathwohl, 2002). In addition, while systematic training and prolonged practice is

required to mastering a domain, active experimentation and exploring is necessary for making remarkable contributions (Csikszentmihalyi, 1996; Davis, 2013; Simonton, 1994; Gardner, 2011).

- c) Opportunities to share: Practice with others involves extending knowledge beyond the learner's comfort zone towards favoring novel outcomes (David, 2013). Moreover, showcasing creative endeavors could bolster creativity by allowing the field to evaluate and provide critical feedback to the creator. For instance, art galleries offer opportunities for visual artists to showcase their talent while bars or even subway stations may provide exposure for emerging musicians.

4.2. Characteristics of individuals that engage in creative work

Individuals that frequently engage in creative work are likely to be:

- a) Intrinsically motivated: When individuals engage in an activity for sheer enjoyment they are more likely to achieve creative solutions than when they are stimulated by external rewards (Amabile, 2017). Even more surprising, , individuals tend to produce more conventional solutions when they are aware they will be judged regarding 'creativity' or 'originality', while the absence of evaluation liberates their creativity and produces more novel results (Gardner, 2011).
- b) Self-critical: Creativity is partly due to people's self-actualizing tendencies driven by a desire to fulfill their potential (Rogers, 1954). Creative people engage in frequent internal assessment of their work and engage in self-regulation of their learning process. (Collins & Amabile, 1999).
- c) Receptive of feedback: Creative individuals are able to receive critical feedback and work with it, developing critical judgement of their own ideas and work (Davis,

2013). They are confident about their creative abilities and have willingness to try new things and make improvement in their work (Csikszentmihalyi, 1998).

4.3. Characteristics of fields that encourage creativity

Fields that encourage creativity tend to:

- a) Provide evaluation: An idea/product must reach the community of practice in order to be evaluated and recognized as creative (Csikszentmihalyi, 1996). Though the acknowledgment that the work is going to be evaluated could hinder creativity (Gardner, 2011) it is impossible to separate creativity from its social evaluation (Csikszentmihalyi, 1996). Different forms of evaluation may have different effects in the creative process. For instance the impact of accountable measurements such as grades and points may be different than the effect of social recognition, positive comments, and prizes.
- b) Provide feedback: The constructive feedback of family, peers, mentors, and teachers can have a significant impact in the creative work of an individual (Gardner, 2011; Csikszentmihalyi, 1996). Critical feedback may guide the creator in meeting the demands of the field in terms of what is novel, useful, and whole for them.
- c) Provide support: Though creative individuals are often thought to work in isolation, the role of other people is crucial for creative development (Gardner, 2011). Research has shown that the creator needs both affective support and cognitive support to pursue creative breakthroughs (Gardner, 2011). This way, family, peers, and teachers can play a significant role by supporting or hindering creative endeavors.

ANALYSIS

5. Study 1: Design Analysis

5.1. Method

The goal of the design analysis is to identify how the elements of the System Model for Creativity (domain, individuals, and field) are assumed to be supported by specific features of WeKnow. It aims to provide a descriptive analysis of how those features may hypothetically promote creativity according to the characteristics depicted in the theoretical framework.

5.2. Findings

5.2.1. Analysis of the Domain in WeKnow

This analysis depicts specific features of WeKnow that may allow tweens to engage with different domains to learn and gain knowledge, ideas, and skills from each other within the online community and in a variety of discipline areas. The features are identified and analyzed according to the characteristics of the domain that, according to the theoretical framework, promotes creativity: (a) knowledge access, (b) opportunities to apply, and (c) opportunities to share.

a) *Knowledge access:*

In WeKnow the videos published by tweens aims to support the transmission and access of knowledge among them. The gallery of videos (see figure 5) is the landing page of the app and features videos in which children demonstrate their knowledge in a variety of topics. In addition to the homepage gallery, children can access galleries of videos classified in several categories by clicking in labels located below the top navigation bar (see figure 5). The categories of videos used in the first prototype are: Arts & crafts, technology, games, science, culture, sports, and nature.

This classification of the videos by themes aims to facilitate the identification, access, and exploration of knowledge connected to their personal interests. This may favor children's identification of their 'element', or domain area in which their passions meets their skills, and facilitate interaction with peers that share same interests. Furthermore, the exposure to information and ideas from other kids may play a critical role in the creative process by providing inspiration and insights for new contributions. Additionally, by watching videos by other children they may gain insights into the tacit cultural values and rules of the app, such as for example: start the video saying hello and be nice to the audience, list the materials and steps to explain how to do something, ask for comments at the end, etc.



b) *Opportunities to apply:*

In WeKnow, in addition to browsing and watching videos to obtain knowledge, children can create their own videos to share with others. In WeKnow, the

video-creation tool may allow children to apply their personal knowledge and skills by creating videos to demonstrate, explain, or perform to others (see figure 6). The video-creation tool facilitates the process of recording and publishing within the same platform without the need to have external recording devices or video-editing softwares. As shown in figure 7, tool provides steps and prompts to guide children in the process of structuring a video in a cohesive and engaging way. It also allows opportunities to practice by allowing users to revise and re-make their video in the last step of the creation process. At the end of the video-creation process children are asked to select a domain category for the video to be published in that specific label of the gallery. This way, children may have the opportunity to apply and practice their knowledge/skills to extend an existing domain within the platform.

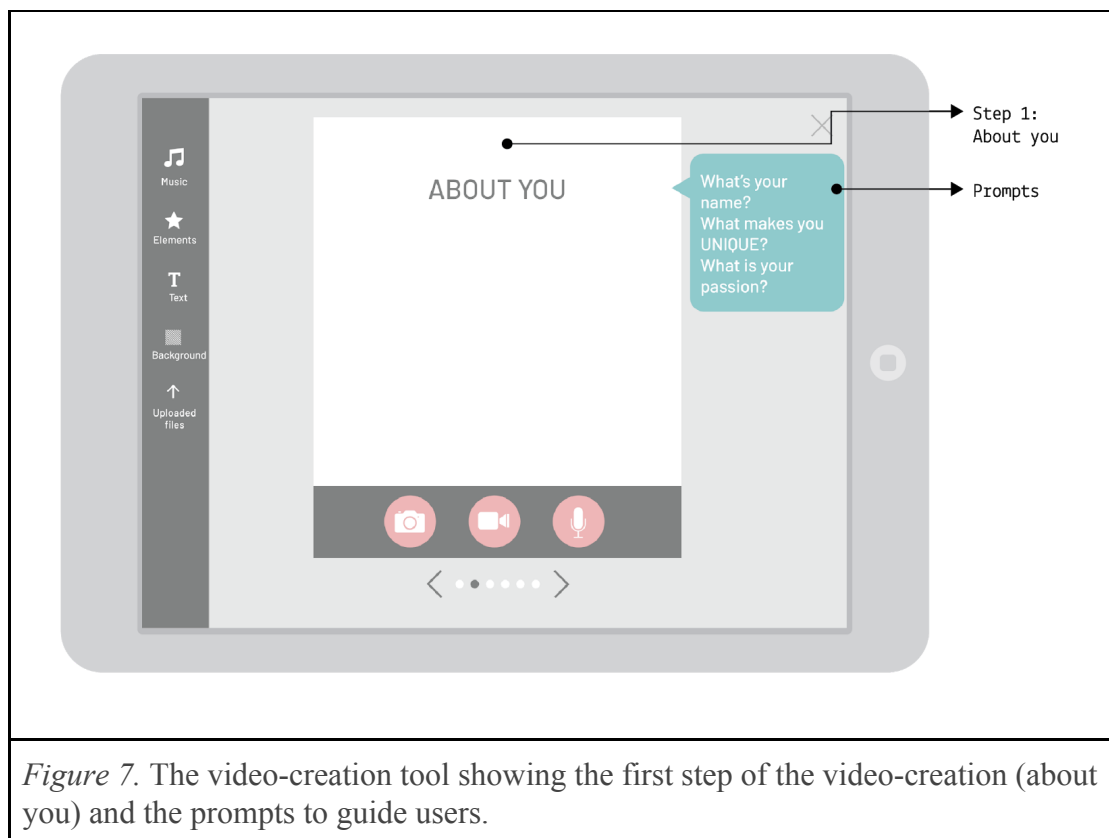


Figure 7. The video-creation tool showing the first step of the video-creation (about you) and the prompts to guide users.

c) *Opportunities to share:*

WeKnow aims to offer a unique environment for tweens to showcase their knowledge and skills to their peers. The assumption is that a place free of external evaluation from adults may favor tweens' creative expression and reinforce their identity as creators. The gallery provides a place for children to showcase their knowledge and skills (see figure 7). The video-creation tool facilitates the process of transforming their knowledge into a shareable unit. In addition, for children, knowing that the video is going to be published to others may encourage them to display their knowledge in the best possible way and extend their capacities away from their comfort zone.

5.2.2. *Analysis of the Individuals in WeKnow*

In order to understand how tweens may act as individuals in the context of WeKnow, by making creative contributions through the available tools while using their knowledge and skills. The analysis identifies and describes features and properties of the app that may support creative individuals according to the theoretical framework: (a) intrinsic motivation, (b) self-critical, and (c) receptive of critical feedback..

a) *Intrinsic motivation:*

WeKnow was conceived as an informal learning environment, or in other words, an environment where learners set their goals and standards of achievement, a place made up for children by children. The design purposely excludes references to formal education language and nor does it provide special features for educators. The app aims to offer an environment where learning is cool and enjoyable. The informal learning property of the app may encourage children's intrinsic motivation to learn

and may set free their creativity. Learning for its own sake may be valuable when it is connected with the children's passions and interests. In addition, tweens may find satisfaction in sharing their knowledge with peers in an environment free of the pressure of adult evaluation.

b) *Self-critical:*

In the video-creation tool children record one video for each step: 'About you', 'what are you sharing', 'why it is important', 'share your knowledge', and 'engage your audience'. At the end of this process children are presented with one single video that merges the videos of all previous steps. In this step children can revise their videos and opt to go back if they would like to make any changes (see figure 6). This feature presents the user with a full version of the video containing all the small videos together. Children will be able to go back and change specific steps if they want to make changes. This feature may enhance self-evaluation processes moved by the desire to share their best to their audiences before publishing the video.

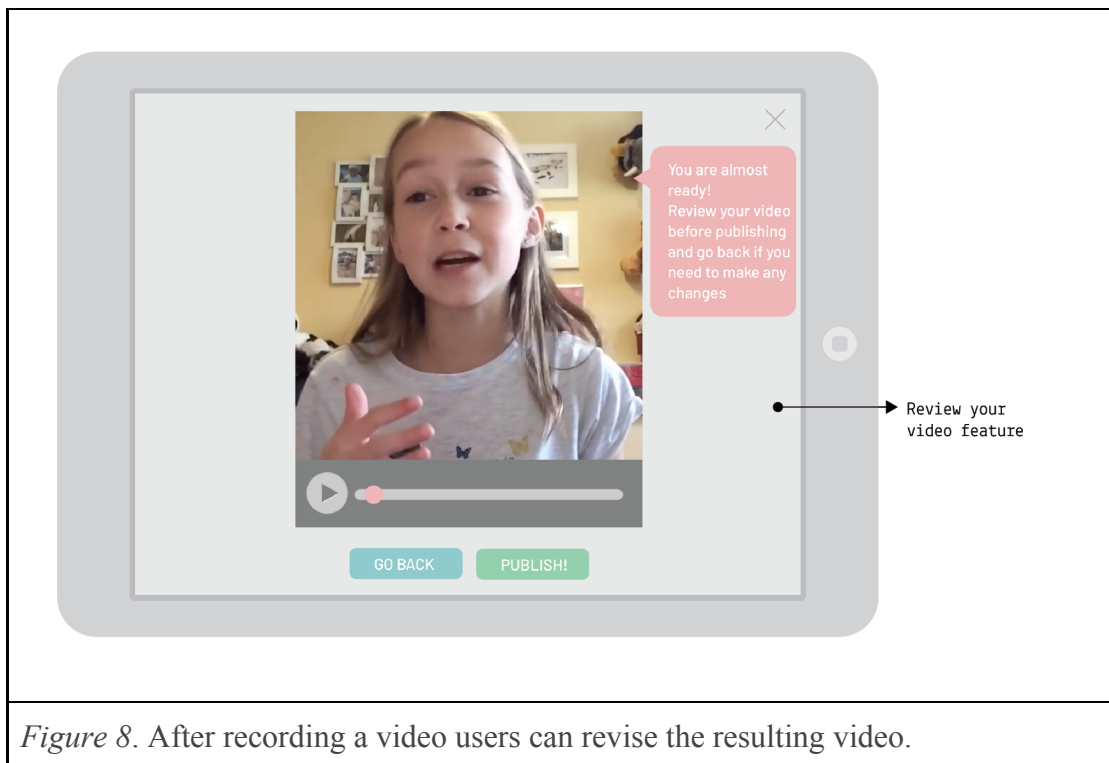


Figure 8. After recording a video users can revise the resulting video.

c) *Receptive of critical feedback:*

In WeKnow, children can receive feedback from their peers in the form of constructive comments showed in an inbox (see figure 9). Constructive comments are generated by any other user in the app by using sentence starters that guide children in the creation of nice, meaningful, and actionable feedback. This type of comment may enhance the user's willingness to respond to the comments, make improvements to their video, or create a totally new version of it to meet the suggestions and challenges of their audience.



5.2.3. Analysis of the field in WeKnow

This analysis depicts specific features of WeKnow that may allow tweens to act as field and assess the creative work of their peers. The features were analyzed according to the characteristics of the field that, as stated by the theoretical framework, promote creativity: (a) provides critical evaluation, (b) provides critical feedback, and (c) provides support

a) Provide evaluation:

In WeKnow evaluation is given under the accountability of 'likes' that are represented by a heart icon and a number that reflect how many people have click it (see figure 10). Likes may possibly be an accountable system for users to evaluate the creative work of their peers in terms of novelty, usefulness, and wholeness.

Nevertheless, the meaning of 'likes' for this target audience and the effect they can generate in the creative process is going to be examined in the study.

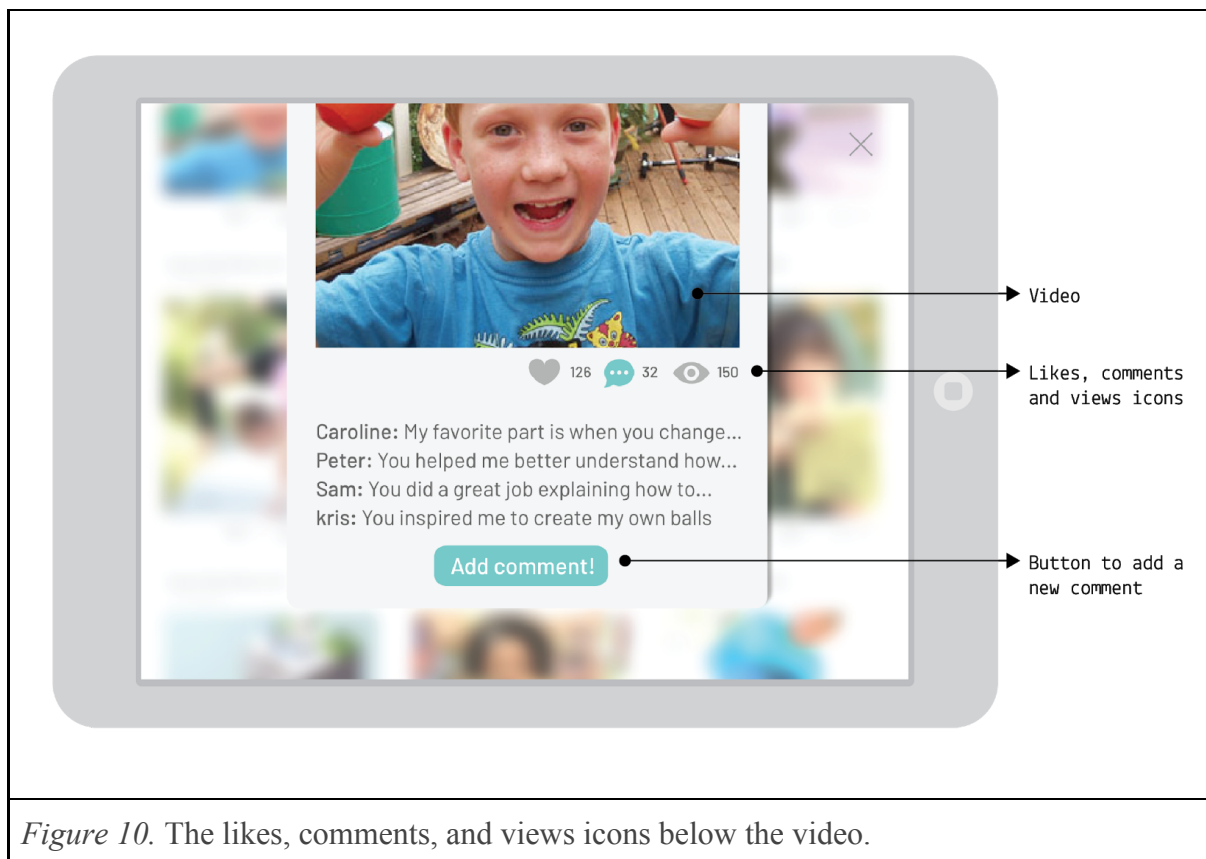


Figure 10. The likes, comments, and views icons below the video.

b) *Provide feedback:*

In WeKnow children can provide feedback to other videos with the help of sentence starters to generate constructive comments. To write a comment children can select from an array of blocks each containing a sentence starter useful to provide constructive feedback (see figure 11). This way they can generate meaningful and actionable feedback in order to serve as criticism for improvement. The sentence starters utilized in the blocks of the first prototype are: My favorite part was ___ because ___ ; You helped me better understand ___ ; What do you mean by ___? ; You did a good job explaining ___, but I think you can improve by ___ ; Why did you: ___? ; I challenge you to: ___ ; You inspired me to ___ ; I want to know more about ___.



Figure 11. The sentence starters to generate constructive comments

c) *Provide support:*

WeKnow aims to provide an environment where children feel confident about their creativity. WeKnow's philosophy is that every kid is creative and has something unique to share and teach to their peers. The app aims to provide an environment that inspires mutual support and positive encouragement. The sentence starters used to generate constructive feedback include words that promote the exchange of emotional and cognitive support. This seeks to generate an online environment where children feel supported and not bullied by others comments.

The design analysis provides insight on which features may promote creativity by supporting characteristics of the domain, individuals, and field that according to our theoretical framework endorse creative endeavors. These assumptions, summarized in table 1, will guide the observational study to understand how those features are actually used and interpreted by tweens and whether they support or challenge creativity.

Table 1

Domains that promote creativity		Fields that promote creativity		Creative individuals	
<i>Characteristics that promote creativity</i>	<i>Design analysis question for observational study</i>	<i>Characteristics that promote creativity</i>	<i>Design analysis question for observational study</i>	<i>Characteristics that promote creativity</i>	<i>Design analysis question for observational study</i>
Knowledge access	How the videos published by children support the transmission and access to knowledge?	Provide evaluation	What does a "like" mean for the users and to what extent can it be considered an evaluation tool for creativity?	Intrinsically motivated	How the app offers an informal learning environment where participants contribute moved by intrinsic motivation?
Opportunities to apply	How the gallery and the video-creation tool offer opportunities to explore, practice, extend, combine, and apply new knowledge?	Provide feedback	How do the sentence starters allow children to act as field by giving constructive feedback to their peers?	Self-critical	How the 'revise your video' feature encourages self-assessment?
Opportunities to share	How the video-creation tool and the gallery offer opportunities to practice and showcase to others?	Provide support	How supported and encouraged do the the creators feel after receiving feedback? Is the app perceived as an environment that supports and encourages creativity?	Receptive of feedback	How the guided comments encourage willingness to work and improve?

Table 1. Characteristics of the elements of the System Model for Creativity in WeKnow

6. Study 2: Observational study

The purpose of the observational study is to explore: 1) how children make use of the domain, or the knowledge available in the platform, to learn from each other and through a variety of discipline areas; 2) how children act as individual creators, or those who bring novelty to the domains, by analyzing the factors and features influencing their creative process; and 3) how children act as field, or those who evaluate creative work, by using the different features to provide feedback to their peers about their creative work.

This way we aim to understand how the design features depicted in the design analysis provide an environment that, according to the characteristics of our framework, may support creative development by fostering the interaction among the elements of the System Model of Creativity.

6.1 Method

6.1.1. Participants and Context

Six 3rd graders, five girls and one boy, participated in the study that was conducted in a study room at Teachers College library. They received the invitation to participate through their parents who consented they participate in the study. Participants' parents were informed of the research purpose and implications and gave permission for their child's involvement (see Appendix A). All participants' names presented are pseudonyms to protect the privacy of the children. All participants have previous experience using tablets and apps and they all have previously used YouTube to watch videos for entertainment. None of them had used WeKnow before.

Participants were asked to bring a special artifact—something they felt they were good at and they could share and teach other children about it—. The artifacts they brought are depicted in table 2.

Table 2

Participant's name	Age	Personal Artifact
Ana	8	Cell Phone with Roblox app
Barbara	8	Magformers
Claire	9	Harry Potter LEGO characters
Denise	9	Chess game
Eric	9	Handmade cardboard characters from The Incredibles
Fatima	9	No artifact

Table 2. Participants, ages, and the artifacts.

In addition, the room was equipped with materials for children to be inspired or for their use in their videos. Arts and craft materials, circuits and electronics, toys, and books where all part of the environment.

6.1.2. Procedures

Each child participated individually in a 45 minutes study that encompassed the use of the three main functionalities of the app: watch videos, comment and like videos, and make a video. Two researchers accompanied the children; one providing guidance while following a protocol (see Appendix B) and an assistant researcher observing and taking notes. In addition, one camera was installed in an evident location in the room recording the whole experience (see figure 12). The participant was presented with an iPad with a partially functional prototype of WeKnow that was designed to visually display the features that support the three main functionalities of the app: the video gallery to watch videos, the feedback tool to give likes and comments, and the video-creation tool to make videos. To simulate the functionality of those features another iPad was simultaneously presented with a

Google form where they were able to watch the videos of the gallery, write comments using the feedback tools, and create a video using the camera. The Google form also collected participants' answers to specific questions that were provided throughout the experience by the researcher.

Using the described equipment, the researcher guided the participant through the prototype with a verbal description and an interactive demonstration of the three main features of the app. After the presentation of each feature the participant was invited to interact with the functionality using the Google form. While doing this, he or she were asked to evaluate or interpret certain aspects of the platform and select their answers in the form.

All participants browsed a gallery of videos, selected one video, watched the video, commented the video using the sentence starter, created their own video using the video-creation tool, choose one category to publish the new video, and received simulated comments from other kids. The simulated comments were generated by the assistant researcher in the room using the sentence starters. Children were told that the comments were generated by other children doing the same research in another library to evaluate the real impact of comments in their creative process.



Figure 12: The studio setting from the angle of the camera

6.1.3. Data sources

The data was collected using three sources: the Google form, the video in the permanent camera, and the videos that children produced in the iPad.

- 1) Google form responses: Participants' were asked to evaluate or interpret different aspects of the app and register their answers in a Google form.
- 2) Video-recording: Children were asked to verbally delve about the answers they selected in the form. These explanations were collected through the permanent camera in the room.
- 3) Participant's videos: Children were asked to create their own video using an iPad while using the video-creation tool of the prototype displayed in the other iPad.

6.2 Findings

6.2.1. Observations on the Domain in WeKnow

The goal of this section is to describe observed behaviours and verbal expressions that, in the context of WeKnow, demonstrate evidence on the characteristics of the domain (the culture, rules, and knowledge of a discipline area) that may promote creativity: (a) knowledge access, (b) opportunities to apply, and (c) opportunities to share.

a) *Knowledge access:*

The study showed that participants were curious and avid about the knowledge available at WeKnow. When the researcher presented the app displaying the gallery of videos, 4 out of 6 participants began immediately pointing out the ones they were interested in and commenting about them. All six of them had defined preferences for domain areas as they manifested interest in specific categories of videos. When the

researcher showed the top menu with the different categories some of the participants spontaneously started talking about the ones they liked. When prompted to choose their favorite one, 3 children choose arts and craft, 2 games, and 1 nature. They were also asked if they would like to see other categories in the menu and four of them assented and provided diverse ideas such as animals, toys, Harry Potter, school-stuff, pottery, boats, and holidays. The categories they came up with are very specific and targeted to their personal interests.

After exploring the gallery of videos, participants were invited to select and watch one of them. All participants seemed very engaged while watching the video and some of them smiled or made demonstrations of emotion. Denise, after watching a video of a girl who explains how to make an American Doll stop motion, explained how the video was useful for her.

I have many American Dolls and stuffed animals at home and I have tried to create videos with them but I always have to stop when I realize I don't have something that I need. In this video, I got ideas to make my own stop motion using resources from home. It was useful because it also added a lot of information. Like the number of pictures you have to take every minute and second. 300 pictures for a minute!

Denise gained specific ideas from the video as well as factual knowledge that she was able to recall. Similarly, other participants manifested their intentions to try some of the things they learned at home. For instance, Barbara wanted to make a cabinet for her American Dolls after watching the same video and Fatima exclaimed "I can try it at home now!" after watching a video where a girl shows how to introduce a boiled egg in a bottle. Eric, on the other side, said he learned how to stand up for himself after watching a video where a couple of elementary aged kids give tips to defeat bullies.

The study demonstrated how curious participants were about specific domains when related to their areas of interest. They were highly motivated to learn from other children of their age through videos. Participants perceived other children's videos as a valid, useful, and fun source of knowledge, information, techniques, and ideas.

b) *Opportunities to apply:*

The app offers children the opportunity to apply their knowledge and skills to a new context and media: an online video. Using the video-creation tool and with the guidance of the steps and prompts, all children were able to create a video representation of their knowledge about the personal artifact they brought to the study. The artifacts participants brought were very diverse (see table 2) as their personal interests were various too: architecture, mobile games, arts & crafts, toys, etc. Nevertheless, the video-creation tool proved to be very versatile and all participants were able to accommodate the prompts and steps to their own domain.

All participants were very excited about making their videos even though they realized it was something challenging. For instance, it was a hard for Denise to explain chess movements even though she considered herself an expert who had won several chess competitions. In a couple of occasions, she needed to stop the video and start all over again because she was confused. It was possible to see how she was actively applying her knowledge to a new context in which she not only needed to understand the rules but also teach them to other children. Likewise, Fatima, explained that making the video was difficult because she had to make decisions on the go and improvise.

The study demonstrated how WeKnow provides children with opportunities to apply diverse knowledges and interests to the context of video-creation. Making the

videos was an active learning and creative process as participants needed to revise their understanding and communicate it to others in a clear and attractive way for other children.

c) *Opportunities to share:*

Five out of six participants declared that, if they had this app at home, they would use it not only to browse videos but also to create and share their own videos. Their enthusiasm for sharing was accompanied with some anxiety associated with challenge and sharing. All children were a bit nervous before starting to record their videos because of the pressure that the exposure to others implies. Four of them demonstrated in their videos to be very aware of their audience. They actively made eye contact with the camera, pointed to different aspects of their artifact, engaged the audience with prompts, and invited them to make comments. They even added popular expressions used in the internet to engage users such as 'don't forget to subscribe!' or 'you can make a comment below!'. After finishing her video about chess, Denise explained that she wanted all kids to like her video, even though she was aware that they may find it difficult to understand.

It may take a while to understand everything if you are new to chess ... It took me long to get use to it. But, if they have a brief basic understanding, I think they may catch up pretty quickly! I hope everybody likes my video ... yeah, I'm pretty sure a lot of people would like it.

On the contrary, two children did not engage the audience during their videos. They occasionally glanced to the camera and they did not teach the content to the audience. Barbara, for instance, demonstrated how to create a very complicated 3D model using Magformers but after her introduction she gave little instructions and she remained in silence while working with the toy. Similarly, Ana made her video about

Roblox, an app in her cell phone. She barely looked to the camera and she neither showed the app to the audience. Instead, she explained the app while looking into her cell phone.

The study showed that when users were aware of their audience they transformed their knowledge to make it understandable for others. For this reason they extended their knowledge beyond their comfort zone and pushed themselves further. On the other side, when participants did not engaged their audience in their videos, their interaction with their artifact was the similar as the one they would have practicing by themselves; thus the learning that occurs when transforming their knowledge into a shareable unit was not evidenced.

6.2.2. Observations on the Individuals in WeKnow:

The goal of this section is to describe observed behaviours and verbal expressions, in the context of WeKnow, that show evidence of characteristics of individuals (those who brings novelty) that engage in creativity: (a) intrinsically motivated, (b) self-critical, and (c) receptive of feedback.

a) Intrinsically motivated:

The study room had plenty of materials for the children to get inspired and make their videos using them. Nevertheless, all participants undoubtedly preferred to do their videos using the personal artifacts they had brought from home. Even, Fatima, that did not bring any artifact, preferred to talk about architecture than use those materials. Children needed something personally meaningful and connected with their interest in order to create a video-representation of it. The motivation to make a video emerged from the connection and knowledge they had with the artifact or personal interest. The more connected the children were with the domain, the more

intrinsically motivated they were. Claire for instance, was very excited about her video about Harry Potter LEGO characters and explained how meaningful it was for her and how much she wanted others to learn about it.

I love Harry potter and I love LEGOS. I'm an expert at this because I've read all the Harry Potter books and I have more than a billion pieces of LEGO at my house . So, I want you all to learn about this because Harry Potter is a very good book and Legos are really nice toys to play with. All the people in my classroom think that Harry Potter is .. rubbish, that makes me really sad. So, I really want all you to know that Harry Potter is very valuable, and so are LEGOS.

Likewise, Denise was thrilled about creating her video about chess from the very beginning of the study; she wanted to finish the first part of the session in order to start making her video. As she explained, chess was an important part of her identity since she became more experienced and won some competitions.

Fatima, was a totally different case. She did not bring any artifact to the study so when it came the time to create a video she lacked ideas and motivation. The researcher showed the materials available at the room and gave several examples of things she could demonstrate with them. After a while, and without considering any of the researcher's suggestions she exclaimed: I think I want to talk about architecture! Starting then, she was very excited about making a video. In her video, she explained why architecture was her passion and how much she loved the city of New York. She also shared specific facts about building shapes and heights, and suggested interesting places to visit.

The study shown how intrinsic motivation to create was rooted in the participant connection with a domain. The more connected and passionate a children was about the topic the more motivated they were to share and the more they excelled

in their creations. To further evaluate intrinsic motivation it will be necessary to observe children using the app outside of a study setting to see how they spontaneously and voluntarily opt to create a video and share their talents with others.

b) *Self-critical:*

At the end of the video-creation process children were asked if they would like to revise their video or make any changes to it. The majority of participants (four out of six) did not want to review or re-make their videos after they finishing them. Eric on the other side, spontaneously wanted to revise his video right after finishing to record. While he watched his video he seemed excited to watch himself and he smiled and silently moved his mouth following his speech through the duration of the video. When it finished he said: 'let's do a different video, it's gonna be a little better ... I'll be asking them what to do'. Nevertheless, he made the same video all over again. When asked if he would like to review it or make changes he refused.

Denise was very aware of her performance and was critical about it. She insisted she wanted to do one single video instead of making one separate video for each step. This was a challenge considering that she wanted to explain all the movements and exceptions of the six different pieces of a chess game. Everytime she made a small mistake she wanted to start all over again to achieve the full idea she had in mind. She said she wanted to start again to make a 'little correction'. Instead of being stressed or worried about the repetitions, she continue to be excited and her video improved with each attempt. In the third attempt she finished the video and jumped of happiness and excitement just after pressing the stop recording button.

The two participants that wanted to re-make their videos were also the only ones that did not use the steps and prompts to guide their video creation; instead they

preferred to briefly look the steps and prompts and then make a single video. Eric, for instance, glanced the steps and did not read the prompts before making his video. As a result, he only explained three out of the five steps suggested by the video-creation tool and he did not incorporate ideas from the prompts. His video lacked the structure of others participants videos and was considerably shorter with a duration of less than a quarter than the average video.

Denise did not used the steps and prompts while making her video either, instead she carefully read them before starting. She tried two times before mastering her full speech which lasted 8 minutes and 30 seconds and included complex rules and exceptions of chess moves explained with outstanding clarity and fluency. She went through all the steps incorporating several ideas from the prompts and also adding new personal ways to reach the objectives of each step.

On the other side, the other four children used the steps throughout their video-creation process and used the prompts to guide their discourse. In this group, it was possible to see how the prompts provided hints and ideas to guide their discourse. When talking to the camera and after finishing one idea, they briefly glanced to the prompts and quickly read them to continue with the next idea. This way, the steps and prompts scaffolded the creation of a whole discourse which resulted coherent and organized when all the pieces were put together into one video. Claire commented that it is easier for children to create videos with the app because "it gives steps and it doesn't put to much pressure in the people".

The steps and prompts seemed to aid children self-regulation learning processes by providing explicit strategies and skills to create their videos. This may have bolster their confidence which may explain their lack of willingness to review.

For instance, Claire after finishing her Harry Potter video refuses to revise it stating 'I don't want to make any changes, because I think my video was pretty good'. Another possible explanation to the children's behaviour is that it was harder to review them with the prototype version of the app, as the videos were not automatically put together into one single video. Future research is required to explore how children self-critical motivation could be enhanced with an updated version of the app.

c) *Receptive of feedback:*

All participants demonstrated to be avid for the feedback of their peers. Two of them finished their videos asking the audience to give comments so that they can improve as showed in the following extract.

I really want to know if you have any comments, on like how I can make this video better or something .. and just write it down ... bye bye (Fatima).

*Thank you for watching my video and I hope you can comment it, and like it Uh .. please tell me how I can improve and ... if I inspired you to do anything new in chess
Thank you! (Denise).*

The inclusion of these comment requests was noticeable considering the fact that it was not something suggested in the prompts. Children wanted to connect with their audiences and know more about their opinion in order to improve.

The last part of the research experience consisted in giving the participants feedback about their video. Participants were told that other children doing the same study in a different room were going to see their video and write a comment for them. To simulate this, the assistance researcher wrote three comments for each participant. The comments were made using the sentence starters and were targeted specifically for the participant's video.

Receiving comments from other kids about their videos was for all participants a very exciting experience. All of them seemed very surprised and they all smiled while reading them. In addition, comments acted as a very effective stimulus for them to create more videos. Right after reading the feedback from other kids they were asked what they would like to do and all of them wanted to create a new video or re-make their previous one. None of them wanted to return to the gallery to browse and watch more videos.

Eric, who previously said he would not make any corrections to his videos, received a comment asking how he made the cardboard characters. Right after reading the feedback he turned the camera on and started making a video explaining the steps to make the cardboard characters. At the end, he added an invitation to his viewers to subscribe to his videos.

This is a second video about my characters. If you would like to know how I made them, I got some cardboard, drew their shapes and colored them in, and ... this one, (shows omnidroid) not exactly sure how I made the red go on .. but I taped a big piece of paper right there, colored it black so it would camouflage it here, and I did it right there so it actually would look like the omnidroid. And if you would like to subscribe .. um ... then just do it!

The enthusiasm of Eric to make a new video after receiving the comment reflects the great impact that peer-feedback has in children this age. He had previously stated that he did not want to revise or re-make his video when asked to, and he also did not listen to the researcher suggestion to explain how to make the cardboard characters. Receiving a comment from another children was for Eric a catalyst for improvement and a motivation to continue creating.

Ana was a similar case. She wanted to remake her video after receiving the comment 'You did a good job explaining Roblox, but I would like to know more

about how to make new friends in the app'. She explained: 'I would like to add something, tell her how to make friends and answer her question'. Receiving a comment was for Ana very significant because she previously stated that she did not want to revise or re-make her video. Likewise, Fatima, after reading the comments, wanted to re-make her video using LEGOS to explain more about the buildings in New York City.

At the beginning of the studio Barbara said that, if she had this app at home, she would use it only watch videos and to create only one video. Nevertheless, after receiving a comment saying: 'I challenge you to make a gigantic pyramid using Magformers'. She immediately said: 'Oh, I know how to do that! I want to create a new video because they challenged me to do it'.

Claire, received the comment 'I challenge you to make an stop motion with Harry Potter legos' and her reaction was a spontaneous 'Huuuuu yes!!!'. She said she would like to make a totally new video to respond to the challenge and also other videos of different topics. She also said she felt proud after reading the comments and that she wanted to write responses to everyone of them. In a similar way, Denise was very excited when she saw the comments; she jumped up down and said she wants to create a new video called 'Chess Part 2'.

The study demonstrated that tweens are very receptive of critical feedback especially when it is formulated in a constructive way. Comments made with the sentence starters triggered the creative motivation of each of the participants encouraging them to engage in a new cycle of creativity.

6.2.3. Observations on the Field in We know:

The goal of this section is to describe observed behaviours and verbal expressions that, in the context of WeKnow, demonstrate evidence of the characteristics of the field (those who assess creative work) that promotes creativity. According to the theoretical framework, the characteristics that are going to be analyzed is whether the field (a) provides evaluation, (b) provides feedback, and (c) provides support.

a) Provides evaluation:

Children were interested in providing 'likes' to other children's videos. Three out of six children wanted to give a 'like' to the video they watch. When asked about how they would use this app at home and 83% (n=6) choose 'watch videos and 'like' some of them' as one of their three primary uses.

Participants were also asked to select the three main reasons why they press 'like' in a video. Their responses were very diverse and many options were selected such as: because it is creative (83.3%), when the video is fun (66,7%), when I learnt something new (66,7%), when the video is funny, when the video is useful (50%), and when the video is about something that I am interested in (50%). It is possible to see that 'likes' are a very broad evaluation tool and that they can mean different things for tweens. There is no necessary correlation between a video having been 'liked' and a video being considered creative.

According to one participant 'likes' could also generate negative effects in the environment of the app: 'kids can compete about the likes their videos receive'. This way, likes could hinder the creative and supportive environment that WeKnow wants to foster.

The study shown that evaluation through 'likes' provides an accountable method to assess each others videos but they do not necessarily mean an assessment of creativity. Furthermore, 'likes' as an accountable method of evaluation could generate an environment of competitiveness among children.

b) *Provides feedback:*

Children were asked to provide a comment to the video they watched using the sentence starters of the commenting tool of the app. Half of the children declared they wanted to give a comment to the video they had just watch. When asked to do it, three choose the option 'My favorite part was ___ because ___', and three selected 'You inspired me to ___'. One kid wanted to give an additional comment and choose 'You helped me better understand ___'. Children did not seem excited about writing comments. They were all able to use the keyboard in the app, but was a slow process for them and they wanted to finish quickly. For instance, they complemented the sentence starters with brief ideas such as 'My favorite part was *when the bully run away*', or 'you inspired me to *make American Doll accessories*'. On the other said, they are very good tapping buttons in the iPad with their finger, for this reason, selecting the blocks to create comments using the sentence starters was intuitive for them and helped them write longer and better comments at a faster pace.

All children except one disagreed that in the app children criticize each other in the comments. Fatima thought that they do criticize each other by making comments like for example 'I think the video was exaggerated or it was too long'. She explained that criticism could be positive or negative and that the comments in this app seemed to be positive for children to improve their videos. Eric disagree that the

children criticize each other and explained 'It sort of that they are friends, the comments are friendly'.

Barbara was very concern that the children in the non-functional app was going to receive the comment that the researcher wrote to demonstrate how it worked. She truly believed the app was real and she did not want to write a comment without previously seeing the video. Later, she added she did not like to make comments because other people may not like them, which she considered to be 'scary'.

The study showed that children this age seemed to understand the weight that a comment can have for the person who receive it. They all were very excited when receiving a comment but they were not equally excited about writing comments to others. The sentence starters helped the process of writing feedback and helped to generate a friendly environment.

c) *Provides support:*

All participants agreed that in the app children support each other in their projects through the comments. Claire explained that 'the comments in this app give confidence to other kids and makes them improve their videos'. In the same line, Barbara said 'children support each other because they tell them how to improve it and what they are good at'. Denise explained that this is an app 'where children show their talents and want to learn new things which is the opposite of competition'. Claire explained that 'the kids are doing the videos for other kids to learn and not to compete with others'.

In addition, the app was perceived as an environment supportive of creative development. Fatima said that 'Every kid that has the app can create a video, I think everyone if they want to they can be really creative'. Claire commented that 'every kid

is good at something and has something to share'. She also stated that she feels she is valued in this community because she was challenged to make new videos and also she inspired other kids to read Harry Potter.

The study demonstrated that participants perceived the app as an environment in which children support each other through comments. The sentence starters contributed with the propagation of nice and encouraging comments. This reinforced the idea of an environment of mutual support and friendship.

7. Discussion

7.1. Theoretical discussion

This section discusses how WeKnow, as an informal peer-learning online environment for tweens, can enhance creativity by supporting interaction among the elements of creativity. The three elements (domain, field, and individuals) and their characteristics described in the design analysis and in the observational study did not act independently. Instead they were integrated into a system in order to enhance creativity. Each element stimulated the function of the other and the described characteristics fostered that process. The domains transmitted knowledge to the individuals which stimulated individuals with ideas to contribute to a domain. These contributions prompted the field to make comments and provide feedback which in turn stimulated the individuals to make new contributions.

7.1.1. Domain knowledge transmission to the individual

First, the labeled categories in the gallery provided children with access to different domains of their interest. Domains provided children with knowledge, ideas, inspiration in the form of videos made by other children of their age. The participants of the study perceived the videos as valuable sources of knowledge and were willing to try out what they

learned. As Csikszentmihalyi (1996) explains "a person cannot contribute innovation to a domain to which it has not been exposed" (p. 29). WeKnow provides children with exposure to multiple domains and thus gives inspiration for potential development as creative participants in any domain.

Children this age demonstrated to have defined personal preferences in some domains over others. Research has shown that discovering your natural capacities and passions early in life can generate significant contributions to well-being and success (Gardner, 2011; Robinson, 2017). Robinson (2009) in his book, *The Element*, emphasizes the importance of providing opportunities for people to discover their element, or in other words, the activities where their passions and talents come together. WeKnow stimulates this process in tweens by giving categories to explore and dive deeper in their knowledge of specific areas of interest. The variety of videos in WeKnow makes it easy for children to identify domains that could potentially be their element. In fact, all participants manifested clarity about their favorite categories and some of them wanted to have additional ones more targeted to their interests and skills.

Participants not only learned techniques and information from the videos in the gallery, but also learned about the rules and cultural aspects of the domain. After watching the video, they knew what they were supposed to do in their own video; how to talk, how to explain, what is valuable, and what had already been done in this online context. In other words, the gallery of videos gives information about the cultural rules of the domain.

The symbolic rules and parameters of each domain are defined by the users' framework of knowledge and ways of knowing. For instance, a 9 year old girl produces a video that shows how to make a cake decorated with fondant. One can argue that her video was not creative as, for the standards of the professional confectionary domain, the recipe

was basic, the technique was not new, and the resulting cake was far from attractive.

Nevertheless, her contribution was very creative in the context of WeKnow as it represents something useful, new, and attractive for this particular field of users. This way, WeKnow provides a learning environment respectful of children's knowledge and ways of knowing even if they are not correct or perfect for adult or professional standards. For this reason, it can be said that WeKnow is a platform about learning and not about knowing.

7.1.2. Individual contribution to the domain and showcase to the field

The knowledge, ideas, and cultural rules gained from the videos in the domain added to participants' personal motivation to share their artifact or passion, stimulated children to make their own video and thus make a creative contribution to the community of WeKnow. As some of the participants pointed out, in WeKnow any children can make a video if they want to because all children have talents and can be creative. This correlates with Csikszentmihalyi's (1996) argument that anyone can potentially be a creative person because creative endeavors are not defined by personality traits but instead by social selection. What counts is whether the novelty that the individual produces is accepted by the field and incorporated into the domain (Csikszentmihalyi, 1996). In a similar way, for a video to be successful in WeKnow it has to be attractive, useful, and novel for the the field which is made up by the users of the app. In online environments, the success of a post is usually correlated with user engagement.

User engagement is measured in the comments, sharing, and 'likes' that their contributions receives. It follows that individuals who generate content with high user engagement generally focus on specific domains – like make-up, magic tricks, gaming – and cater their content to a specific target audience. They gather popularity and engagement because the content they publish is valuable for that specific audience. This way, participants

who demonstrated to be more receptive of critical feedback from their peers are more likely to succeed, as they target their content to the preferences of their audience. In addition, the prompts in the video-creation steps helped participants engage their audience and think about their learning needs while making their video.

7.1.3. Field evaluation of the individual creative contribution

"The domain is necessary for a person to innovate in and the field is required to determine whether the innovation is worth making a fuss about" (Csikszentmihalyi, 1996, p.2). The size of the field in relation to the domain can vary considerably. In WeKnow the field was represented by the entire community of users of the platform. The field used comments and 'likes' to evaluate each others videos.

While participants were avid to receive comments from their peers, they were not so enthusiast about making comments to others. There could be many reasons for this. One possible reason is that writing a comment implied using the keyboard which was less fluent than the rest of their interactions with the iPad. Another possible reason is that they simply did not know what to comment to the specific videos they watched. Further research is required to understand how to stimulate the feedback process, specially as receiving comments was revealed to be key in stimulating the development of new creative work.

When children received a comment they were more excited than in any other part of the study. After reading them, they all wanted to create new videos and incorporate the feedback in different ways. The sentence starter that most stimulated children desire to make a new video was 'I challenge you to...' as it was a very actionable feedback. Comments demonstrated to be a catalyst of creativity among participants and a source of support for the community. This way, the field played an important role closing the cycle of the System Model for Creativity to stimulate renewed creative endeavors in the individuals.

In addition to comments, participants used 'likes' as a tool to evaluate the contributions of their peers. The positive effect of the likes in the system model of creativity is disputable. 'Likes' proved to have multiple meanings for the participants and their intention was not clear. On one side, children were enthusiast about the idea of giving a 'like' to another video and 83% of them wanted to give a 'like' to the video they watched. On the other side, receiving 'likes' can be a source of anxiety for children this age and, as one participant mentioned, a cause for competition. 'Likes' can become the motivation behind contributions which may hinder intrinsic motivation which is one of the most relevant characteristics of individuals that engage in creative work. As Gardner (2011) explained, the absence of evaluation unleashes creativity and leverages unconventional outcomes. This correlates with Csikszentmihalyi's (1988) ideas around the state of 'flow', in which the individual is fully absorbed in the creative activity without regards to possible recognition or rewards. 'Likes', as an accountable source of validation, may shift children's focus from their intrinsic motivation to external motivation. This may generate anxiety for obtaining extrinsic rewards which may hinder creative work and promote competition among the community.

While 'likes' proved to be a counterproductive tool to enhance creativity, comments and constructive feedback demonstrated to be a powerful tool for the field of peers to evaluate each other, provide support, and encourage creativity.

7.2. Design discussion

This section discusses how specific design features of WeKnow enhance or hinder creativity by fostering interaction among the elements of the system model of creativity. The functions and characteristics of the different features were interconnected and played an important role stimulating the operation of each other function. The gallery and the videos

gave users ideas, knowledge, and cultural clues to create new content. Users generated content using the video-creation tool which guided the process through steps and prompts. Finally, other users evaluated creative contributions using the sentence-starters for making comments which in turn stimulated users to generate new videos.

7.2.1. The gallery of videos as a support for the domain

In WeKnow, domains in the gallery provide a tapestry of content that gives users knowledge and information about what has been done and what is considered valuable for users. Children can access specific domains of their interest using the labeled categories below the navigation bar. These labels provide a way for learners to access the different domains so that they can easily identify their element (Robinson, 2009). The domains selected for the first prototype were: Arts & crafts, technology, games, science, culture, sports, and nature. While children seemed to like those categories they also wanted to see more categories and they proposed very specific categories that were highly targeted to their interests: Harry Potter, animals, boats, school-stuff, pottery, toys. Beyond this, they suggested categories that were already part of the labels we had, such as pottery which could be part of arts and crafts. It would be unrealistic to support all the categories children demand especially because of the specificity and variety of their suggestions. One design solution could be to allow users to generate their own categories and classify the content into domains that they are interested in.

Fixed categories like the ones used in the first prototype of WeKnow can be found in other platforms designed for children such as Scratch and Youtube Kids. This allows young users to easily find projects or videos connected with their interests. On the other hand, platforms created for adults such as Pinterest and Youtube allow the user to create their own boards to save the posts of their interest. This second alternative provides users with the

flexibility to delineate the limits of more specific and smaller domains. For example, a pinterest's user interested in doll-houses can make a personal board to save posts related to this specific category of arts and crafts. This solution can meet the participant need to have more targeted categories and may facilitate the definition of more specific domains and areas of interest. A design update like this needs to be study to understand its potential to enhance creativity and also other possible effects.

7.2.2. The video-creation tool as a support for individual creators

In WeKnow, users can make contributions to the domain by recording and publishing new videos using the video-creation tool. In the study the researcher demonstrated with an example how the video-creation tool works which proved to be very helpful for participants. In a similar way, the next prototype should incorporate a video tutorial for first-time users of this functionality of the app. Because WeKnow is a learning environment for children by children, the tutorial should be done by a children of the targeted age.

The video-creation tool provides steps and prompts users to organize their ideas and guide their creation process. The steps (about me, what are you sharing today, why do you want to share it, show your knowledge, and engage your friends) provided significant support for children to structure their discourse into a coherent narrative. The last step, engage your audience, was not as easily understood as the previous ones by the participants. A new title for that step could be included in a next prototype to facilitate the understanding of this important part of the narrative.

The prompts provided ideas or insights on topics they should talk about in the different steps. While some of them were used in every video they made, a few of them were rarely incorporated in the videos such as: 'explain what makes you unique' and 'why are you an expert at this'. These prompts could be replaced for new ones in a next prototype. On the

other hand, participants came up with new remarks that achieved the communication ideas proposed in the prompts. These sentences are common in online environments where the participants had previous experience such as Youtube. 'You must be thinking why ...', 'Don't forget to write a comment below!', or 'please, let me know how I can improve my videos' are all examples of sentences they formulated and that could be suggested in the prompts. For instance, 'invite your friends to comment' and 'ask for ideas on how to improve' could be added into the last step for children to encourage the audience to make more comments.

The steps and the prompts demonstrated to be successful scaffolds for participants to organize their ideas and help them elaborate a coherent narrative. Nevertheless, it was also observed that some children needed them more than others. Design alternatives should be explored to offer children an alternative to create videos without scaffolds once they have mastered the steps or if they prefer to create one single video while using the prompts.

Finally, the video creation tool gave the option to revise the entire video only at the very end. It was not contemplated in the first prototype the option to revise and re-make the videos after each step. This lack of opportunities to revise and re-make may hinder self-criticism which is a key characteristic of creative individuals. A renewed version of the prototype should consider the option to save, revise, and re-make the videos resulting of each individual step to encourage children to revise them and improve their work throughout the process.

7.2.3. The comments and "likes" tools as a support for the field evaluations

Children this age are increasingly aware of approval from others. As a recent study explained "likes are seen as an affirmation and validation from peers that made children feel good about themselves and their lives" (Longfield, 2018, p.28). This study found a transition in children's view of likes as they grew older; while tweens wanted their published content to

be liked by their friends, teens were worry about *how many* likes their publications received. This way 'likes' become an increased source of anxiety and competition for children as they transition from tweens to teens. Youth and technology expert Amanda Lenhart's in the 2015's Pew study of teens, technology and friendships, reveals that social media can generate pressure and anxiety in young users to post content that will be popular and gets likes. For this reason it is particularly relevant to create a learning environment for tweens free of this source of pressure and stress. WeKnow wants to create a new environment where children do not compete but support each other, a place where learning is enjoyable for its own sake, and personal creative expression is encouraged and respected. In order to promote this environment, future versions of WeKnow should eliminate the 'like' button as a feature for feedback and evaluation.

On the other hand, comments demonstrated to be a stimulus for creativity. The sentence starters allowed children to generate meaningful and constructive comments that produced an environment of support and positive digital citizenship. Future versions of the prototype should find ways to encourage users to create more and better comments for their peers in order to fuel new creative cycles.

CONCLUSION

Creativity in digital media has gained relevance as educational research had singled it out as a key digital literacy for the 21st Century (Resnick, 2001; Jenkins, 2006). Children are expected to develop digital literacies and are increasingly encouraged to participate in technological environments as active contributors and creators. The social context plays a fundamental role in creative development and online communities can be influential social environments for children. Research is required to understand how creativity is enhanced in

said digital context by analyzing the social interactions that promote the active participation of young users as creators.

WeKnow, an online peer-learning community for tweens, addresses creativity in tweens by fostering social interactions that may encourage creativity. The platform goal is to engage learners as content producers, shifting tweens' media-use from consumers to creators of media. This research uses the System Model for Creativity (Csikszentmihalyi, 1996) as a way to understand the app's social dynamics that promote creativity. This model explains that creativity arises from a dynamic composed of three elements: a domain or culture that contains symbolic rules, a person who brings novelty into the domain, and a field of experts who recognize and validate the innovation. This research combined an analysis of design features with observations of users interacting with the app to identify and describe the elements of the system (domain, field, and individuals) and characteristics that may stimulate or hinder creativity.

From a theoretical standpoint, the data collected demonstrated that the three elements (domain, field, and individuals) described in the design analysis and in the observational study did not act independently within the online community. Instead they were integrated into a system that enhanced creativity. Each element stimulated the function of the other and the described characteristics fostered that process. The domains transmitted knowledge to the individuals which stimulated individuals with ideas to contribute to a domain. These contributions prompted the field to make comments and provide feedback which in turn stimulated the individuals to make new contributions. The understanding of this integrated system in digital communities provides valuable insights on how creativity can be triggered through online social interactions that stimulate the cycle. One of the most remarkable conclusions is the impact that different forms of evaluation from the field had in participants.

On one hand, accountable measurements such as 'likes' shifted children attention from creativity to competitiveness. On the other hand, constructive comments proved to booster creativity by stimulating participants to make new creative contribution to address the feedback of their peers.

From a design perspective, the data collected demonstrated how the different features of the app were interconnected and played an important role stimulating the operation of each other to support creativity. The gallery and the videos represented the domain by giving users ideas, knowledge, and cultural clues to create new content. Individuals generated content using the video-creation tool which guided the process through steps and prompts. Finally, other users acted as field by evaluating creative contributions using the sentence-starters for making comments which in turn stimulated users to generate new videos. The identification of specific design features that could support the elements of the System Model for Creativity provides insight on which aspects of the app need to be improved in order to enhance creativity. The three most important aspects to be revised in the design are: providing more opportunities for children to revise the videos before publishing, give more incentives to make constructive comments to encourage more creative contributions, and the elimination of the 'likes' to foster a positive environment.

The System Model for Creativity proved to be an appropriate model to analyze everyday creativity in digital environments. Because this model had been mostly used to analyze the creative work of notable figures, future research could address the design of a renewed framework targeted to everyday creativity in digital environments. This framework could incorporate terms and dynamics that are exclusive to online social communities and that represent the elements of the Social System for Creativity in different ways. For instance, in online environments, individuals are commonly known as users and their creative

contributions are posts or publications. The field is composed by the users when acting as viewers and they use comments and likes to assess others' publications. These terminologies could be applied to the System Model for Creativity to extend its application to the understanding of everyday creativity in digital communities and facilitate research in the increasing number of digital technologies for content creation.

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Appendix A

Parent/guardian consent form

TEACHERS COLLEGE COLUMBIA UNIVERSITY

Protocol Title: Play-testing: WeKnow, an online peer-learning platform for tweens.

Principal Investigators: Adriana Selman, ~~Dadrianna~~ Williams, Maria Isabel Coereza, and Rocio Conde

Dear _____,

INTRODUCTION

Your child is being invited to participate in a research study called "Play-testing: WeKnow, an online peer-learning platform for tweens".

WHY IS THIS STUDY BEING DONE?

This study is being done to explore the functionality and affordances of a learning app in development.

WHAT WILL MY CHILD BE ASKED TO DO IF I AGREE TO ALLOW MY CHILD TO TAKE PART IN THIS STUDY?

Your child will be asked to explore the app in development, watch videos of other kids sharing their talents and interests, write comments to these videos, and create an original video with our support.

WHAT POSSIBLE RISKS OR DISCOMFORTS CAN I EXPECT FROM MY CHILD TAKING PART IN THIS STUDY?

This is a minimal risk study, which means the harms or discomforts that your child may experience are not greater than they would ordinarily encounter in a normal school day. The principal investigators are taking precautions to keep your child's information confidential and prevent anyone from discovering or guessing your child's identity, such as using a pseudonym instead of your child's name and keeping all information on a password protected computer and locked in a file drawer.

WHAT POSSIBLE BENEFITS CAN MY CHILD EXPECT FROM TAKING PART IN THIS STUDY?

Participation in this study may improve your child's creative self-esteem.

WILL MY CHILD BE PAID FOR PARTICIPATION?

Your child will not be paid for participation. Your child will receive a snack and a small gift at the end of the session.

WHEN IS THE STUDY OVER? CAN MY CHILD LEAVE THE STUDY BEFORE IT ENDS?

The study will be conducted at Teachers College Gottesman Library. The session will last approximately one hour. Your child can leave the study before it ends when needed. Parents or caregivers can escort their kids to the library if they wish.

PROTECTION OF YOUR CHILD'S CONFIDENTIALITY

The investigator will keep all written materials locked in a desk drawer in a locked office. Any electronic or digital information (including audio and video recordings) will be stored on a computer that is password protected. What is on the audio-recording will be written down and the audio-recording will then be destroyed. When the words on the audio-recording are written down, your child's name will not be used.

HOW WILL THE RESULTS BE USED?

The results of this study will be published in our Masters Integrative Project. Your child's name or any identifying information about your child will not be published.

CONSENT FOR AUDIO AND VIDEO RECORDING

Audio and video recordings are part of this research study. You can choose whether to give permission for your child to be recorded. If you decide that you don't wish for your child to be video recorded, your child will still be able to participate in this study, but audio recordings are necessary. These recordings will not be shared and will only be used for research purposes and viewed by the 4 students conducting the research.

_____ I give my consent for my child to be audio and video recorded _____
Signature

_____ I do not consent for my child to be video and audio recorded _____
Signature

WHO CAN ANSWER MY QUESTIONS ABOUT THIS STUDY?

If you have any questions about taking part in this research study, you should contact the principal investigators.

PARTICIPANT'S RIGHTS

- I have read and discussed the informed consent with the researcher. I have had ample opportunity to ask questions about the purposes, procedures, risks and benefits regarding this research study.
- I understand that my child's participation is voluntary. I may refuse to allow my child to participate at any time without penalty.
- If, during the course of the study, significant new information that has been developed becomes available which may relate to my willingness to continue my child's participation, the investigator will provide this information to me.
- Any information derived from the research study that personally identifies my child will not be voluntarily released or disclosed without my separate consent, except as specifically required by law.
- I should receive a copy of the Informed Consent document.

My signature means that I agree that my child may participate in this study

Print name: _____ **Date:** _____

Signature: _____

Appendix B

Research protocol

Step	min	Action	Question [Q] / Observation [O]	Rationale
1	1	Introduction	What's your name? What did you bring today? Why did you choose to bring that?	Understand participants' connection, interest, and previous knowledge with their artifact
2	10	Researcher demonstrate app functionalities	-	Get participants to familiarize with the platform and understand its overall functions
3	1	Right after the demonstration	Q: If you would have a platform like this at home in an iPad, how would you use it? a) Watch videos b) Watch videos and give likes c) Watch videos and make comments d) Create and share my own videos	Understand participants' attitude toward technology before using the platform: consumers or creators?
4	1	Browse the gallery of videos	O: Look for facial expressions or expressions of interest and engagement	Understand how participants gather knowledge and cultural clues from domains through their peers' videos
5	2	Click labeled categories of videos	O: Look for facial expressions or expressions of interest and engagement Q: Which is your favorite category? Would you like to see a different one?	Understand participants' domains of interest and motivation to learn. Users may be gathering knowledge and cultural clues from domains
6	2	Select and watch video	O: Look for facial, verbal, or physical expressions of interest	Users may be gathering knowledge and cultural clues from a specific domain of their interest
7	1	Right after the video ends	Q: What would you like to do next? a) Browse and watch more videos b) Give a like to the video c) Write a comment to the video d) Create your own video e) Don't know what to do	Understand the impact of the interaction with the domain in the users and their attitude as consumers or creators of media
8	2	Give a like to the video	Q: When do you feel you are supposed to press like? (choose 3 options) a) When the video is creative b) When the video is original or new c) When the video is useful for me d) When the video is nicely done e) When the video is fun f) When the video is surprising g) When the video is cute h) When the video is funny i) When I learn something new j) When is about something I am interested in k) To give support and encouragement	Understand the meaning of likes for the participants and their possible effects in the creative process.
9	2	Guided conversation	After seeing the video, from 1 to 5 do you feel that: - The app inspires me to try things that other kids show - In this app children compete with each other - In this app children support each other in their projects through comments	Understand participants' perception of characteristics of domains, individuals, and field that promote creativity

			<ul style="list-style-type: none"> - In this app I can share with children from different cultures and backgrounds - In this app children criticize each other in the comments - In this app I can know more about things I like such as techniques and ideas - In this app I can showcase my talents to others - In this app only some kids can create videos - In this app I can learn from other kids - The Video Gallery inspired me to have new ideas 	
10	2	Giving feedback to a video	<p>Q: Would you like to give a comment to the video you just watch? Use the sentence starters to write a comment.</p> <ul style="list-style-type: none"> - My favorite part was _____ because _____. - You helped me better understand _____. - What do you mean by _____? - You did a good job explaining _____, but I can think you can improve by _____. - Why did you _____? - I challenge you to _____. - You inspired me to _____. - I want to know more about _____. 	Understand participants as field. Focus on their ability to make constructive comments to other children their age.
11	4	Create video	<p>O: Observe how the participant use the steps and prompts to guide his/her discourse. Observe the children attitude, behaviour, and comments.</p>	Understand participants' perception as individual creators: focus on intrinsic motivation and self-criticism
12		Guided conversation	<p>Q: Same questions as step 9</p>	Understand participants' perception of characteristics of domains, individuals, and field that promote creativity after creating a video and compare with step 9 results.
13		Receive a comment	<p>Q: What would you like to do after reading this comment?</p> <ol style="list-style-type: none"> a) Browse and watch videos b) Respond to the comments c) Re-make my video d) Make a totally new video e) Close the app 	Understand the impact of comments in participants' creative process and perception of the field. Re-evaluate children self-criticism.