

Affordances and Constraints of Scaffolded Learning in a Virtual World for Young Children

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ABSTRACT

In recent years there has been a marked increase in the number of virtual worlds aimed at populations between the ages of 6 to 14 years. This article examines the content and design of one such site, Webkinz World, as a sociocultural context for informal learning. Focusing on the design and activities of this site sheds light on the ways in which Webkinz World supports learning, especially for nascent users, and the apparent limits of these structures as users gain more expertise.

Keywords: Development, Early Childhood, Elementary, Learning, Scaffolding, Sociocultural, Video Games, Virtual Worlds, Webkinz

INTRODUCTION

The term learning often conjures up images of structured lessons in which children are guided through activities by the expertise of a teacher or a knowledgeable adult in a formal context such as a classroom. In recent years, however, increasing attention has been paid to the role of informal contexts in children's learning and development. Due to their massive user bases and widespread popularity, video games and virtual worlds are being recognized as important informal spaces that may influence young people's learning and developmental trajectories. For instance, researchers have examined how game-based activities may align

with school-based skills, such as sophisticated learning and literacy practices (Apperley, 2010; Gee, 2003; Salen, 2007; Steinkuehler, 2007), collaborative problem solving (Squire, 2005), informal scientific reasoning (Steinkuehler & Duncan, in press), and informal science learning (Fields & Kafai, 2009; Kafai, 2008; Kafai & Giang, 2007).

The majority of the aforementioned research has focused on games targeting adolescents and adults; however, of late, there has been a veritable boom in the arena of virtual worlds for elementary school aged children. Sites such as *Webkinz World*, *Club Penguin*, *Barbie Girls*, and *Poptropica* are wildly popular, with registered user bases that number in the millions (Compete, Inc., 2009). In spite of the sheer numbers of children who frequent such

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spaces, there is very little research on the kinds of activities and learning that children are engaging with in such spaces. Some exceptions include Marsh's (2008, 2010) ongoing work exploring how virtual worlds such as *Club Penguin* and *Barbie Girls* may impact young children's learning, literacy, and digital literacy development, and how online spaces may allow children to experiment with different social roles (March, 2010) through their play. Merchant (2009) also studies the use of immersive 3D spaces in classrooms and describes how "innovative digital literacy practices such as those involved in virtual world game play can easily disrupt classroom routines and call into question deeply held assumptions about literacy, literacy instruction and even the teacher-pupil relationship that lies at the heart of the educational process" (p. 39). However, these studies do not explicitly address the process of learning, especially the affordances of these virtual sites for supporting and cultivating knowledge. In other words, little is known about the design features and structures of these popular virtual worlds that enable children to move from novice to mastery in both the goals of the sites as well as the available content.

This article addresses this gap in the research by providing an examination of the content and design of the site, *Webkinz World*, as a context for informal learning. In particular, we examine how the game is designed in ways that both support and hinder children's learning. By focusing on the design and activities of this site, this study explores the ways in which *Webkinz World* can support learning, especially for nascent users, and the apparent limits of these structures as users gain more expertise.

SOCIOCULTURAL THEORY AND SCAFFOLDED LEARNING

This article is grounded in a sociocultural perspective that stresses the centrality of social and cultural resources to processes of thinking and learning. Sociocultural theory posits that a child's mental functioning emerges from the ma-

nipulation of cultural material and development of psychological tools (Karpov & Bransford, 1995). This includes play that is mediated by tools and artifacts, as well as symbolic systems such as language. From this perspective, a space such as *Webkinz World* may serve multiple roles in children's learning. For instance, the computer provides the sociocultural context for activity and interaction as well as many of the cultural artifacts and tools that are used in such activities. In addition, the computer also serves as the more capable or expert other that structures learning experiences within the virtual world. Thus, the design of such environments plays a significant role in shaping children's learning experiences therein.

According to sociocultural theorists, children learn a great deal from the "appropriation of modes of speaking, acting, and thinking that are first encountered in collaboration with adults or more capable peers" (Minick, Stone, & Forman, 1993, p. 5). This type of supported learning is often discussed in terms of scaffolded learning or learning within the zone of proximal development (Vygotsky, 1978). According to Vygotsky (1978, p. 86), the ZPD "is the distance between the actual developmental level" of a child "as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance, or in collaboration with more capable peers." In this formulation, the more capable other assists the child in reaching his/her problem-solving potential through "recruitment of the child's interest, reduction in degrees of freedom, maintaining goal orientation, highlighting critical task features, controlling frustration, and demonstrating idealized solution paths" (Stone, 1993). In essence, the adult or more capable other structures the learning experience to support the learner's success.

In this article, we extend this metaphor of scaffolded learning to our understandings of how the computer, as a more capable other, may provide similar supports for players' learning in *Webkinz World*. In addition, we focus on the

ways that incomplete scaffolding and/or lack of clear goals for potential development may limit the ZPD and impede children's deeper learning and subsequent cognitive development.

Method

Data for this article stem from comparative case studies of several virtual worlds for young children. These case studies are based on participant observation and qualitative content analysis of the learning, literacy, and developmental features of such sites. Data collection has focused on creating maps of the site contents, developing records of available activities, and gathering artifacts. The content analysis was conducted using an open-ended, qualitative protocol that focused on the design features (technical and aesthetic), literacy-related texts and activities, learning and problem solving, community, and technology skill-related features of the sites. These texts were analyzed using discourse and social semiotic analyses. At this point in the project, participant observation and data collection did not involve any interaction with or recording of children's activities. The researchers' observations were instead aimed at gaining a rich sense of the affordances for learning in this space.

ANALYSIS

Webkinz World

Webkinz, marketed by the Ganz corporation, are stuffed animals that come with a unique code that allows the purchaser access to the shared virtual environment of *Webkinz World*. Children participate in this world by manipulating avatars or digital versions of their stuffed Webkinz toy. After joining the site and adopting their pet, children receive a virtual home for their pet and 2000 KinzCash, the in-game currency that allows them to participate in the *Webkinz World* economy by purchasing goods and services for their pet.

The *Webkinz World* landscape features bright colors, pastoral scenery, and highly

anthropomorphized animals for non-player characters (NPCs). Activities include individualized forms of play such as shopping for clothes and furniture at the W-Shop, growing plants in an outdoor garden, completing jobs at the Employment Center, taking vacations through the Travel Agency, attending classes at the Kinzville Academy, and enjoying single-player games at the Arcade. More social forms of play include competing against other players in the Tournament Arena, inviting friends over to visit your virtual room, or spending time in the Kinzville Clubhouse or Park, where avatars can walk about freely and players can use in-game chat systems to socialize with other players.

Ease of Use Versus Creativity

Marketed by its creators as a "safe, educational, and fun online community" (Ganz, 2009; Take a Tour, n.d.), the world of Webkinz is designed to support young players' participation in multiple ways. For example, numerous tutorials are available that highlight important features of the site and model successful engagement with different parts of the world. These tutorials draw from a range of semiotic resources to mediate players' understanding, including text, video, movement, color, sound, and shared visual attention (Black, 2010). The user interface is also designed to assist young children with site navigation. The main user interface, known as the *dock*, couples text with icons as a way of helping children to associate the words and pictures with aspects of the game that they represent. Also, the various interfaces across different parts of the world (i.e., those associated with specific games) use relatively consistent iconography and spatial design to support navigation and allow early readers to participate in activities even if they are unable to read printed instructions or understand them in their entirety.

As another example, each new area that a user enters in *Webkinz World* has a link to instructions and/or a NPC that greets the user and explains the features of the area. For instance, when entering the KinzStyle Outlet (Figure 1),

Figure 1. KinzStyle Outlet



PJ Collie, a trendily dressed dog, explains (with overhead text bubbles and voice) what players are able to do at the Outlet. This includes buying different types of clothing, checking out items on the sale table, designing real-world, for-purchase clothing with the T-shirt designer, and creating new items with the Clothing Machine. PJ Collie's introduction is coupled with colorful button-style links that are identified both with text labels and with picture icons (e.g., "BELTS" with a picture of a belt). Thus, novices are instructed about what is possible in the area and guided through activities via multiple semiotic tools.

In addition to NPC greetings in new areas of the site, different activities also provide written instructions and are often visually self-explanatory. For example, when a Webkinz approaches and clicks on a stove, a new window opens with a picture of three burners, a button labeled "cook," and a book titled "how to cook" (Figure 2). The user can drag food items from the dock to each of the burners and press the "cook" button. Swirling images appear and the message, "Voila, you have made..." appears. The new creation is then revealed and added to the user's dock. As a similar example, the aforementioned Clothing Machine, presents users with three grayed out buttons in which to drag items of clothing from their docks. This

visual is accompanied by text instructions that read, "Drag items from your dock into the button slots above." After filling the relevant slots, the "Make It!" button changes from grayed out to full color, and children can click on the button to create a new item which is then added to their dock.

While these examples illustrate the many ways that users are supported in their first steps away from actual ability to potential ability, it is worth noting that the ZPD is rather small in *Webkinz World*. Specifically, supports are strong for initial contact with and learning to navigate site features, but the site provides far less support for deeper and richer understanding of the concepts introduced through games and activities. For instance, while the stove and clothing machine features are accessible to novices because they guide new users through the cooking or clothes-making process, they do not provide any information about how to become a better cook or seamstress or about how to make more successful creations. Some unlikely food (e.g., strawberries + watermelon + spaghetti = Wer-rigetti) and clothing (Tan Suit Pants + Sparkly Pink Bow + Tuxedo Shoes = Sparkly Silver Pants) combinations count as a recipe or pattern, while others simply result in gunk, a pudding-textured substance that varies in color from drab to bright, or a patchwork clothing item.

Figure 2. How to cook



In terms of scaffolding, player's errors while cooking and sewing yield little feedback about how to avoid future missteps, as the colors of gunk and patchwork appear to be only randomly associated with the colors of the items used to make it. Moreover, there appears to be no rhyme or reason to the items required for successful cooking or sewing. Thus, it is impossible for children to recognize patterns and move toward more independent functioning with these features. In fact, the only ways to improve at cooking or clothes-making activities are either through trial and error, purchasing a recipe book, or buying a television and watching the Chef Gaspacho show, which typically includes a new cooking recipe. As such, children are confined to pre-existing recipes and patterns and have no options for exercising creativity in these domains.

Scaffolding Versus Extending Knowledge

Webkinz World also offers a variety of structured opportunities for learning through games and activities. For example, many of the Arcade games explicitly focus on academic skills such as addition, typing, spelling, logical thinking, and problem-solving by integrating these skills

into the fun of the game (Black, 2010). Other activities mimic print-based literacy lessons such as cloze passages in which readers are given a drop down menu of words to choose from when filling in the blanks to complete a narrative. As another example, Quizzly's Question Corner (QQC) (Figure 3), a game show activity in which players earn KinzCash for participating, also mimics print-based lessons by offering children multiple choice questions based on general trivia and academic topics across the curriculum (e.g. The Arts, Social Studies, Health, Math, Language, Science).

During these games and activities, the computer acts as a more capable other, scaffolding children's progress through the various learning tasks. Take QQC as an example. For this activity, the flashy game show format, the engaging NPC talk show host Quizzly the Bear, and the lucrative KinzCash prizes are used initially to recruit children's interest. In order to maintain this interest, QQC uses a variety of strategies. These strategies include rules for completing the game and prizes as extrinsic motivation. Another strategy is using thematic consistency across topics of interest to children (e.g., brown bears, sea creatures, dinosaurs) as a way to promote situational interest (Krapp, Hidi, & Renninger, 1992). QQC also lists play-

Figure 3. Quizzy's Question Corner



ers' high scores as a form of performance motivation. By limiting possible pathways through the game or responses to questions (i.e., through drop down menus or multiple choice options), players' degree of freedom in completing the task is reduced, and the critical task features are emphasized. Moreover, by providing hints when an incorrect response is selected, these activities aim to minimize player frustration and demonstrate possible solution paths as well as targeted feedback and/or hints. For example, when answering the question "Which one is a lever?" if players choose an incorrect response, the hint "You find one at the park" is given in order to elicit the correct response of "see-saw." In addition to the hints, QCC removes incorrect answers, every 4-5 seconds, reducing the number of distracters for children to consider. When only one option remains (i.e., the correct answer), the child can still earn Kinzcash by selecting it. Thus, failure is not possible unless the user does not respond to any of the choices before all the time elapses from the timer clock. Through these design features, the computer provides the scaffolding needed to help players achieve success in these games and activities.

QCC effectively guides players toward the correct multiple choice responses, thereby allowing them to successfully answer ques-

tions that may be a bit beyond their skill level; however, it only haphazardly supports the development of intramental functioning and independent problem-solving, which is a crucial component of successful scaffolding (Stone, 1993). To be more specific, many questions offer hints that only assist players in guessing the correct answer to a particular question but do not further their domain knowledge or help them to formulate responses to future questions. For example, for the question "Which one is a mammal?" players are guided toward the correct response of "cat" with the clue "Meow!" Not only is this clue tantamount to giving them the correct answer, it does little to increase their knowledge of the class of mammals, nor does it give them the tools to answer similar questions independently in the future. As a similar example, for the question "Which things does a bean plant need to grow?" after choosing or being guided to the correct answer of "Soil, water and sunlight", players are provided with concluding feedback that reads "Plants need sunlight so they can make their own food." While this feedback offers a slight extension of players' knowledge, it does not include the technical vocabulary term of *photosynthesis* that would both extend their knowledge in this domain and help them to answer a subsequent question in the Science series: "What is it

called when a plant makes its own food from sunlight?" Thus, the intermental supports are strong for answering questions correctly with the help of the computer, but children's ability to advance independently within the ZPD, and answer questions without assistance are limited.

Safety and Support Versus Authentic Communication

Communication is another highly scaffolded feature of *Webkinz World*. The site features two primary modes of communication, KinzChat and KinzChatPlus. KinzChat, which is available to all players, restricts communication to a pre-set list of words and phrases that are arranged topically and hierarchically. Users initially select one of three types of comments: "rap" (replies and short expressions), "say" (statements) or "ask" (questions) and from each of these categories, phrases or questions are available from a dropdown menu. For instance, a user could select "ask" and then "about you" and from that category, "What is your favorite thing to do in *Webkinz World*?" Because the vocabulary and phrases are simple and contextually situated in *Webkinz World*, the KinzChat (Figure 4) system can allow players to both construct and comprehend messages that may be a bit beyond their typical reading and writing level. Thus, the system is designed in such a way that it both scaffolds players' communication and addresses parents' concerns about safety.

The KinzChatPlus system, which requires parental permission, affords users a greater degree of freedom than the pre-structured KinzChat system. KinzChatPlus is part of a common genre of chat systems known as "dictionary messaging." In this system, players are able to type freely provided that their messages fall within the dictionary of accepted words and phrases for the site. Because misspellings are highlighted in red to indicate their exclusion from the dictionary of acceptable terms, it is possible that the KinzChatPlus system can help older children to recognize and correct such errors. The constraints of these

chat systems also may help guide children toward safe, social online interactions, as they restrict players from revealing personally identifiable information (e.g., names, addresses, ages), exchanging unpleasantries (e.g., words like ugly), or conveying explicit content (e.g., profanity, sexual content). In spite of these potential advantages, the restrictive nature of these systems presents several problems in terms of children's learning and development.

First and foremost, because the KinzChat system requires users to choose from a successive list of categories, it may be developmentally untenable for younger users. To be more specific, choosing from a drop down menu requires the sort of class-inclusion abilities that research suggests children do not master until adolescence (Siegler & Svetina, 2006). To successfully communicate with other users in *Webkinz World*, children must understand the categorization of topics through these hierarchical classes in order to retrieve the target phrase. For example, in order to invite another child to play a game, users must intuit that their desire is a question ("ask") regarding an activity ("about stuff to do") in order to find and select "want to play a game?" Nothing in the design of the messaging system helps children to understand these hierarchical relationships other than the freedom of trial and error. This is unfortunate as ample research has demonstrated that highlighting the relationship between classes can scaffold learning and improve class inclusion abilities (Siegler & Svetina, 2006; Sheppard, 1973). In addition to the three categories of text (rap, say, ask), the KinzChat system provides emoticon and symbol buttons in which users can select an image instead of a text comment. Punctuation marks (e.g., "?", "!") and yellow faces with different expressions (e.g., smiley face, crying face) are available and can allow simple, yet communicative, interactions with other users. However, these images will not support children's increased understanding of the print-based communicative features of the KinzChat system.

Along similar lines, because the KinzChatPlus system excludes misspellings, it actually

Figure 4. KinzChat



prevents early writers from using their emerging literacy skills—specifically invented spelling—to communicate. In addition, the system excludes words and phrases in a manner that is unintuitive at best. For example, the system allows players to type the words “first” and “second” but not “third” or “fourth,” or “guitar” and “piano” but not “banjo” or “sitar.” The system also excludes phrases that may allude to explicit material (e.g., coming, on you), forcing children to come up with alternative phrases that are often grammatically incorrect in context (e.g., are come). To illustrate how this limits communication, a group of Webkinz pets were observed sitting around a campfire in the Kinzville Park. One of the players tried to type that “A lot of people are coming [to sit around the campfire] now,” but because the system excludes the word “coming,” the player was forced to type, “A lot of people are come in now.” This seemingly random and/or culturally-specific selectivity makes it difficult for children to intuit what is or is not permitted and prevents them from developing a fluid and grammatically correct means of communicat-

ing. This brings us to the last and possibly the most problematic aspect of these chat systems, which is that they hinder authentic communication between players which in turn shuts down the potential for peer-to-peer scaffolding and for players to teach and learn from each other while participating in shared activities and contexts. Thus, by choosing highly structured and constraining formats, the *Webkinz World* designers have created chat systems that function outside the boundaries of many players’ ZPDs.

DISCUSSION

While the highly scaffolded design of many *Webkinz World* features may allow children access to the site at a young age and enable them to succeed at activities that are slightly beyond their developmental level, in terms of learning, this structured environment also can have significant drawbacks. As Stone (1993) points out, many formulations of scaffolding pay scant attention to the mechanism by which learners move from intermental (interaction

with others) to intramental (psychologically/cognitively internalized) functioning on tasks. A key component of the ZPD is that the novice also becomes the knower such that the “nonknower demonstrates equality in the dyad by becoming equally responsible for solving problems and accomplishing tasks” (Litowitz, 1993, p. 185). In other virtual worlds, such as *Second Life* and *Club Penguin*, users develop mastery and while there may not be truly reciprocal interactions, users are able to create and invent on the site (e.g., costumes, applications, etc.). On *Webkinz World*, users are limited by the design features to never become equals with the site. Basically, true mastery is limited because there are no allowances for true independent action in the world. Users cannot truly create (e.g., outfits, food, novel games with other users) nor can they freely communicate with other users in the social areas of the site. In addition, for many of the academic domains (trivia, writing) there are limits to mastery because the scaffolding does not support more complex reasoning or understanding.

A more systematic approach to scaffolding in the *Webkinz World*, preferably one that is grounded in educational theory and content, might address a good many of these issues. To illustrate, activities such as cooking and clothes-making could focus on teaching children about food groups or color combinations. When cooking, children would then be required to put items from each food group onto the different burners in order to make a viable recipe. At a minimum the foods entered should somehow resemble the resulting product, such as strawberries, watermelon, and raspberries making red gunk or even better, a fruit salad. When making clothes, children could be required to use appropriate color combinations that would yield a new outfit in an appropriate novel color (yellow + red = orange) or to use patterns and textures that remain consistent (e.g., floral prints yield a floral product rather than solid color or polka-dotted creation). This type of consistent design would provide a means for children to internalize the rules associated with such an activity, which would in turn allow

them to move toward more independent and successful functioning. It would also allow for player choice and some measure of creativity while they learn.

As another example, for games and activities such as QQC, the structure of questions, possible answers, hints, and final feedback could be systematized in ways that support learning. For example, a set of questions might focus on helping children recognize the characteristics of different classes of the animal kingdom. Hints could include specific characteristics of and vocabulary related to each class. The final feedback provided after questions are answered could include vocabulary and information relevant to topics that will be introduced in the next set of questions (e.g., questions related to orders of animals). This sort of design may allow players to answer questions and solve problems independently and help them to gain some knowledge about specific content domains.

The chat systems could also be designed to support children’s ability to communicate more successfully. For instance, highlighting the relationships between selected categories could help young users better understand the nested nature of the text options. Further, when users select the “?” symbol, the “ask” categories could appear to help children connect questions with the symbol and to help them specify the type of question they might want to ask. For more sophisticated users, the messaging system could highlight parts of speech such as categories of nouns, verbs, and adjectives so that children who want to talk about specific things (e.g., the room) or activities (e.g., playing) could construct phrases about those topics. For the KinzChatPlus system, greater attention should be placed on which words are prohibited and how these restrictions may hinder children’s development of grammar and authentic communication, especially given that little research has explored which terms and phrases are banned (Grimes, 2008).

Other simple games within *Webkinz World* could also provide explicit feedback to help users improve and succeed. For instance, the Jellybean Challenge (Figure 5) is a special

Figure 5. Jellybean Challenge



activity that occurs regularly on the site. Users are presented with the image of a large clear jar filled with varying numbers of jellybeans and asked to “guess the number of jelly beans in the jar!” Users can type in a number and then receive one of four possible responses: “Wow. That was way off”, “You’ll need to be closer!”, “Not a bad guess!” and “Oooo, that was close!” No information is ever provided about how many jellybeans the jar could hold or whether guesses over- or underestimate the number of jellybeans. However, this quantification task could easily be scaffolded by providing users with more explicit and useful feedback such as “that’s a little too high” or “Wow, that is more than the jar can hold.”

Based on the findings of our content analysis, Webkinz World is structured in such a way that it often supports children’s basic understanding and successful performance of activities on the site. However, the design features that scaffold children’s efforts at learning do not provide a mechanism for children to move beyond the simple goals of the site (game-defined goals), to achieve their own learning goals or excel in more complex ways. This is unfortunate since when

learning through the ZPD, the teacher, or in this case the computer as the more competent other, “allows and encourages children to stretch their abilities and to take risks with new experiences, materials, and challenges” (Moll & Whitmore, 1993, p. 37).

CONCLUSION

Vygotsky’s (1978) concept of the ZPD provides a useful explanation for how children move from their current level of development to much higher levels, through the support and guidance of a more competent partner. The zone, or space, defines the distance between what is currently present and what is possible. It is a theory of maturation that focuses on “the ‘buds’ or ‘flowers’ of development rather than the fruits of development” (Vygotsky, 1978, p. 87). When space for growth is restricted, as through the abilities/actions of the teacher or the affordances of the activity/site children’s potential growth is limited.

As Rogoff (1991) pointed out, children are not passive recipients of expertise but active learners; seeking assistance, trying out new

skills, and even demanding supports when needed. In *Webkinz World* the level of activity that children can exert towards learning is greatly limited based on the design features of the site. For example, children can put every item of clothing they have into the clothing machine, but they will never master the output as the space for mastery and potential learning is limited.

To draw on the metaphor of scaffolding more explicitly, the amount of support structures (scaffolds) for novices is quite high on *Webkinz World*. There are numerous design features such as talking NPCs, colorful images, and integrated text that help new users determine the goals and activities of different areas of the site. However, as children move through the ZPD, the scaffolds lessen until they no longer provide any support for children to achieve higher levels of development. Applied to Vygotsky's theory, *Webkinz World* is rich with intermentalization (social) processes but lacking in ways to encourage intramentalization (individual learning). Thus, children have few opportunities for creativity and independent action on the sites.

Shared virtual environments can be important and enjoyable platforms for informal learning, and *Webkinz World* provides ample examples of ways to support new users' entry into such an arena. However, one of the primary benefits of video games and virtual worlds is that they allow for the sort of learning through play in which the player "enters an imaginary, illusory world in which the unrealizable desires can be realized" (Vygotsky, 1978, p. 93). Creativity, imagination, and action are central to this formulation of learning through play (Vygotsky, 1978). Thus, design choices for these types of sites should consider how to support children's learning in ways that go beyond the basic levels of navigation and participation. Instead, conscious efforts should be made to design scaffolds that promote active engagement and mastery and to include ample affordances for the sort of creativity and independent exploration that supports more complex forms of learning.

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