

Chunking, Priming and Active Learning: Toward an innovative and blended approach to teaching communication-related skills

Graham D. Bodie^{a*}, William G. Powers^{b1}, and Margaret Fitch-Hauser^c

^a*Purdue University, Indiana, USA*; ^b*Texas Christian University, Texas, USA*; ^c*Auburn University, Auburn, USA*

Possessing communication-related skills is vital to student success within and beyond college. The utilization of these skills, or being considered socially competent, has been linked to personal, relational, and occupational success. But how do we teach the necessary social skills to today's students? Building on research from education and cognitive psychology on chunking, priming, and active learning, we propose an innovative, blended teaching method (Concept Keys), the utility of which is in its capability to present complex skill sets in manageable units of information, thus allowing students time to reflect on and incorporate such information into their schema of what it means to be socially competent. A case study is presented to establish the potential for this approach and to propose a call for further research.

Introduction

The importance of communication-related skills within all facets of life has been well documented. Often referred to as social skills, communication-related skills—competencies such as speaking, listening, writing, and critical thinking (see Leigh, Lee, & Lindquist, 1999)—have been shown to increase occupational (see, for example, Evers & Rush, 1996; Zorn & Violanti, 1996), relational (see, for example, Burleson, 1995; Flora & Segrin, 1999), and personal (see, for example, Segrin & Givertz, 2003) success. Although the importance of such skills is unquestionable, teaching these skills can be challenging. In the present paper we present the Concept Keys (CK) instructional system, which allows a blended approach to teaching communication-related skills, and a case study, which demonstrates the potential

*Corresponding author. Department of Communication, Purdue University, Beering Hall of Liberal Arts and Education, Room 2114, 100 University Street, West Lafayette, IN 47901, USA. Email: gbodie@purdue.edu

impact of this form of blended learning upon student retention and adoption of social competency skills.

Blended Learning: A definition and explication

Blended learning refers to a method of instruction that utilizes two or more complementary approaches to teach the same material. When instructors use traditional lectures combined with activities, discussions, online modules, and/or textbook supplements, blended learning is being used. Although the notion of blending instructional approaches is not actually new in the classic sense (students have been required to read books and articles for a long time prior to attending a lecture), the exponential growth of technology in the classroom has both refocused the direction of and increased applications for blended learning.

Technology and Blended Learning

The past decade has seen an explosion of technology use in the classroom. A simple perusal through the *Encyclopedia of Educational Technology* (Hoffman, 2004) shows hundreds of entries that capture the options available to supplement (in the case of blending learning) or replace (in the case of many distance education programs) a traditional lecture-based pedagogical approach. Such technological advances as textbook supplements (see, for example, Sellnow, Child, & Ahlfeldt, 2005), online interaction (Rovai & Jordan, 2004), and audience response systems (see, for example, Fitch, 2004; Hake, 1998) have been gaining acceptance and are all examples of how to blend a traditional lecture-based approach with technology to make engagement with course materials or the classroom environment itself more interactive and to potentially enhance learning.

It is largely accepted that different learning objectives require different teaching methods. Some concepts can easily be taught by explanation, while other concepts require a more haptic approach. Some concepts can be easily taught in an online setting, while other concepts require face-to-face interaction. Thus, the focus of any blended learning approach should be to determine the best way to teach certain concepts in order to maximize student learning potential. Technology, in any manifestation, should only be incorporated into the learning system when its use works as well as or better than another method. This perspective is soundly based on research that warns against the wholesale adoption of blended learning (Derntl & Motschnig-Pitrik, 2005; Sellnow et al., 2005). Other research indicates that when blended learning is used appropriately as a pedagogical tool it can be as effective if not more so than traditional teaching methods (see, for example, Dean, Stahl, Sylwester, & Pear, 2001; DeLacey & Leonard, 2002; Rainbow & Sadler-Smith, 2003). Moore (2005) suggested, “for achieving some learning outcomes the face-to-face classroom is an ideal technology. The administrator’s and instructor’s problem is to know when to use the classroom and *when* to substitute an equally or more effective and less costly alternative” (p. 130, emphasis in original). Thus, the use of blended learning should

be considered a strategic choice by each individual instructor based on his or her teaching philosophy, subject matter, class size, and other relevant variables.

One potentially strategic use of blended learning is to utilize the strength of web-based technology to supplement the accepted structure of our educational system. This system is based on the notion that the best way to teach complex material is to break it into small, manageable units or bits of information. This is reflected in the organization of our textbooks and the layout of a typical lecture. We teach students steps, guidelines, and strategies that aid in their successful implementation of a competency. Moreover, research from cognitive psychology and learning suggests that information is more easily remembered (Cowan, Chen, & Rouder, 2004; Miller, 1956, 1994) and strategic choices more easily made (Gobet & Simon, 1996, 1998) if small bits of information are built into larger stores or chunks of information that can be recalled in necessary situations. Related directly to communication, the skills necessary to engage in effective interaction include a range of cognitive and behavioral records that must be recalled and preformed in multiple situations on a daily basis.

Relying solely on traditional teaching methods may not sufficiently motivate students to build the necessary stores of what it means to be socially competent. The challenge, then, is to identify the best way to prepare today's students to become competent communicators. In the sections that follow Concept Keys (CK) is presented as a tool that allows instructor's to integrate a blended learning model for teaching communication-related skills that incorporates an online learning module with a more traditional classroom environment. The utility of CK is in the capability of this web-based technology to present complex skill sets in manageable units of information, thus allowing students time to reflect on and incorporate such information into their schema of what it means to be socially competent. As stated by McCroskey (1982), "we must continue to break down complex communicative behaviors into small component skills that can be learned" (p. 6). CK is grounded in the research from education and cognitive psychology and uses web-based technology in a strategic manner that has the potential to increase learning.

The Five Primary Components of Concept Keys

The CK system has five primary components: chunking, repetition, priming, personal relevance, and web-based technology. Each of these components work together to provide for the most viable way to instill behavioral change and resulting competence – to use innovative teaching techniques that establish a base level of skills and employ novel testing methods to guide students in relating the information to their inherently different lives and overall ways of communicating. If communication-related instruction is going to meet the needs of students we need to develop innovative means of both delivering the message and inviting the active participation of the student. Thus, CK is based on sound learning theories and incorporates the nuances of today's technologically savvy student. The concepts of chunking and priming provide an excellent theoretical frame for such an innovative learning system.

Applying Chunking to Skill Building

Largely attributed to the work of Miller (1956, 1994), chunking refers to the process of organizing and grouping small units of information into larger clusters. The ability to chunk information (a) helps an individual remember more, (b) gives the individual a means of accessing the information that is ultimately stored in his or her memory, and (c) increases “the amount of information we can deal with” (Miller, 1956, p. 95). Miller suggested that this process is ongoing as we recode information constantly in an effort to assimilate new information with current knowledge. For instance, as we learn new information, if it sounds familiar or if it fits into an existing category we tend to remember and relate the new information to the existing category, creating powerful connections within the chunk (see also Gobet & Simon, 1996; Higham, 1997).

Thus, chunking serves as both a triggering device and as a code building device for our memory. The triggering aspect of chunks relies on the strength of a chunk or group of related chunks. Chunks are arranged in a hierarchical fashion, so the most memorable items will consist of information that is most relevant to the individual attempting to learn (Servan-Schreiber & Anderson, 1990). Code building is often accomplished through replication of chunks or related information that allows the participant to recall chunks for later use. As students build a system of codes (i.e. chunks), patterns begin to emerge which enable them to link related chunks and eventually build larger and larger stores of information (Koch & Hoffmann, 2000). Consequently, students are able to develop skills that are more complex than simple rules yet straightforward enough to be stored in memory, enhancing expertise in a given competency.

Skills in general are based upon two fundamental components: (1) information acquisition and retention about the cognitive processing function; (2) information acquisition and retention about the behavioral options and conditions. In the CK system each of these components contains interrelated “chunks” that are identified as keys to the concept under question (e.g. message production, message reception, customer service, leadership). These keys are collections of bits of information (both cognitive and behavioral) that, when taken together, are more significant and have a greater impact than individual bits of information in isolation.

Fifty keys to success have been developed in each of seven different content areas: communicating clearly, listening effectively, projecting a positive attitude, becoming a solution-maker, leadership during challenging times, improving customer service relationships, avoiding perceptions of sexual harassment, and equality and opportunity for all: inclusiveness wins! A key is a brief statement reflecting a specific collectivity of bits leading to enhanced skill in the desired area. In other words, each key represents a chunk of information. The brevity of each key allows learners the greatest opportunity for understanding, retention, and cross-application at both the cognitive and behavioral levels (see Figure 1).

Each key is followed by four brief paragraphs, usually of no more than two or three sentences, the content of which reflects varying degrees and combinations of

Successful Interaction Means...

Communicating Clearly

Key #1: Take personal responsibility for quality communication!

- We have so many easy excuses that we can make when other people misunderstand what we really mean. "You didn't listen to me!" "My boss is the dumbest critter on this planet!" "I know what's happening here, you've got an attitude problem, that's what! Now listen up the next time I'm talking!" We seem to always have the option of placing blame upon the other person--or we could take the wiser path of accepting part of the responsibility ourselves.
- Our actual communication results will improve only when we recognize that part of the blame is within ourselves. This does not mean we are totally at fault. However, ultimately, the real responsibility for personal success or failure lies with us and our own communication skills--not with others.
- Our career success depends upon our communication results. Communication results depend upon your accepting responsibility for communicating clearly and effectively—then you have a reasonable chance.
- Set your goal to be a successful communicator-- regardless of the skills of the listener. Accept the personal challenge of being excellent.

Food for Thought Questions

- 1) How would you evaluate your current use of this Key?
- 2) To what extent would increasing your effective use of this Key help you achieve your short-term or your long-term goals?
- 3) To what extent do you plan to develop your ability to effectively use this Key?
- 4) What are you actually going to do to improve your effective use of this Key?

Note: After students receive a daily invitation via email they are directed to the CK web site, log-in with their username and password, and receive a micro-lesson with a brief Key, explanation and motivation, and Food-For-Thought questions.

Figure 1. Example key from the Communicating Clearly Program

explanation and motivation. Explanation is often in the form of a more specific description of one or more of the bits associated with the key or contexts within which the key may be identified more easily. Motivation consists of varying combinations of descriptions of negative outcomes from non-use of the key and/or positive outcomes from use of the key (see Figure 1).

As previously argued, since both approaches are essential to the ultimate improvement of an individual's skill, some of the keys are more representative of cognitions, while others are more representative of behavioral options. Without internalized knowledge of information processing options as well as behavioral options, learners will not have choices from which to draw if attempting to communicate more effectively when such an effort is dictated by the context and situation.

As can be seen in Figure 1, "Take personal responsibility for quality communication!" is offered as a key to communicating clearly. The purpose of this key is to

establish in the mind of the learner the importance and necessity of his or her role in effective communication. It is meant to establish an attitude within the learner that she/he is, at least in part, responsible for the success or failure of any given communicative episode. The four bullet points that follow this key are representative of the explanation and motivation components of the CK system. These bullets operate to (a) explain what taking personal responsibility might look like, (b) emphasize the importance of taking such an approach, and (c) offer a challenge to the learner that motivates him or her to apply this key to his or her life.

The chunking component of the CK program is based solidly upon research. Chase and Simon (1973) and Gobet and Simon (1996) reported that three areas of expertise are important in skill development: pattern recognition, selective searching, and rich knowledge in the domain of expertise. In looking at the performance of master chess players, two studies (Gobet & Simon, 1996, 1998) concluded that professional chess players appear to rely on chunking to categorize their knowledge and to access information. In other words, they use their catalog of information to look ahead and make strategic choices about what move to make next. It stands to reason that this concept can be extended to communicative acts. If given a method of chunking information into useful categories, communicators should be able to build a knowledge base of skills and ultimately be able to access this information to make decisions about what type of skill they need to use in a given situation. We believe that the CK method gives students information in the form of keys that can be chunked, as well as suggestions for ways to create these chunks in the form of motivation and explanation. Just as chess players appear to store chunks about patterns of pieces in their long-term memory, communicators also need to store chunks about communication strategies and techniques in their long-term memory.

Chunking and Repetition

Another element that must be included in any effective instructional effort is repetition. Not only are our memories organized and stored in chunks, they are reinforced through repeated exposure to an idea, concept, or skill. In one regard chunking provides an avenue for repetition insofar as the chunks are built as bits of information and compressed or integrated into a chunk (i.e. keys followed by bullet points). This is particularly evident in observations of a variety of ritualistic behaviors, such as many compulsive behaviors (Graybiel, 1998). Although communication is not a ritualistic behavior, it stands to reason that we engage in communication episodes often enough that many of the skills considered necessary for communicative competence are performed in chunks.

However, we often learn the wrong behavioral sequences, leading to increased chances for miscommunication. To help the learner incorporate correct behavioral and cognitive records to be recalled in the correct context CK has built in two components of its programs that aid in this repetition aspect of chunking. First, some keys are repetitive in nature and cross over potential applications. This is based on the assumption that students will attach meaning to keys differently and contexts in

which the keys can be applied are inherently different. Moreover, this repetition allows the student to build larger chunks of information based on similarities between keys and allows for extended priming opportunities across contexts. Since each student will find the material to be more or less relevant, these larger chunks are likely to be different from student to student.

Second, the CK system involves delivery of only one key per day via an e-learning portal accessed directly from the learner's preferred learning environment. By not overwhelming the student with information, she/he is more likely to retain each key and can reflect on past keys each day, leading to enhanced incorporation into memory.

It is also assumed that as we learn more skills we build cognitive and neural sequences that help us use these skills. Further research in the area of learning supports this conclusion. In three experiments on sequence learning Koch and Hoffmann (2000) found clear support for the idea that sequence learning can be thought of as a chunking process. Students who attempt to learn a series of related concepts employ a process that Koch and Hoffman labeled "relational chunking." By chunking information that is similar into large sequences of information, skills can be taught and competence in a certain area can be improved. Developing skills or sets of skills, such as those evidenced by effective communicators and listeners, can be thought of as a learning process in which the steps and concepts are presented in a sequential pattern. Once students learn the pattern, the concern shifts to how they can recall the concept or pattern for use when they have so much information in so many chunks stored in memory. Priming theory responds to this concern.

Using Priming to Recall Chunks

Priming theory focuses on how information is retrieved from memory. Priming, viewed as spreading activation, works to retrieve information from memory when a priming stimulus is presented and sets off a chain of events in which one node of a concept is linked to another (Doshier & Rosedale, 1989; Ratcliff & McKoon, 1988). Ratcliff and McKoon (1988, p. 405) suggested that:

the prime and the target concept form a compound cue and that this compound cue interacts with memory to produce a value of resonance, goodness of match, or familiarity that is determined by associations in long-term memory between the prime and target.

Therefore, if the prime is directly related to the target concept, the individual will have an easier time recalling the concept as a chunk of information.

Priming is instantiated into the CK system in two main ways. First, each chunk of information, as explained above, includes both the appropriate behavior and an example of at least one situation in which the set of behaviors should be used. This pattern of association provides a convenient chunking mechanism that is closely connected to effective communication-related skills, allowing the learner to easily

access this information by triggering the associations. Second, each daily key is followed by four food-for-thought (FFT) questions that direct the individual to that particular chunk of information and encourage the individual to make a decision about how to increase their use of that particular key. Those questions are as follows: (1) how would you evaluate your current use of this key? (5 point scale ranging from not effective to extremely effective); (2) to what extent would increasing your effective use of this key help you achieve your short-term or your long-term goals? (5 point scale ranging from not helpful to extremely helpful); (3) to what extent do you plan to develop your ability to effectively use this key? (5 point scale ranging from not a priority to extremely high priority); (4) what are you actually going to do to improve your effective use of this key? (open-ended response). Each question builds off the previous in a way that allows the student to reflect on his or her present use and how this aspect of his or her communication might be improved. The final question, especially, places the responsibility for learning on the student, which is the focus of the next section. Student answers are stored in a unique database for that key and that student. Instructors have access to all student input and can utilize this information in multiple ways (e.g. sending emails to students who appear not to be taking the assignment seriously).

Beyond Chunking and Priming: Personal relevance and web-based technology

One challenge communication instructors face is continually finding new and innovative methods to teach communication-related skills. Strategic deviations from the formal classroom setting (i.e. lecture focused instruction) can incorporate a sense of practicality and fun, which can enhance learning (see, for example, Gravett & Petersen, 2002). For instance, enhancing the relevance of material can motivate students to fuse new information with present knowledge, forming a more thorough understanding of the subject at hand. Thomas and Busby (2003, p. 228) concluded that “self-managed learning” can foster independent critical thinking and increase competence. Likewise, when teaching listening Cost, Bishop, and Anderson (1992) “encouraged [students] to explore and understand what words, phrases, or topics get them emotionally involved; what their listening strengths and weaknesses are; and how to recognize what motivates other people to speak and behave as they do” (p. 42). By making social skills instruction personally relevant, teachers help students improve these skills.

Personal Relevance

CK uses self-managed learning and personal reflection, which have been shown to increase satisfaction with learning. Specifically, reflexive thinking is encouraged each day by the use of the FFT questions and once more per week as students choose their most important key (MIK). Each week, after all five keys have been presented, students are prompted by the question, “Of the five (5) most recent keys you have

received, which one is most important to your career success?” After choosing this MIK students are asked, “How will you apply this Most Important Key in your everyday interaction?”

In addition to these built-in personal relevance motivators integrating self-selection and self-determination, the expected success of the CK system is also contingent upon the instructor taking on the role of program leader and providing motivational leadership in the form of high student involvement in program decision-making and assisting to make the learning process enjoyable and individualized.

Web-based Technology

The pervasiveness of technology presents another challenge to relevance. The reality of student reliance on technology for all aspects of life, including education, gives instructors new tools that can enhance student learning and participation. However, as mentioned earlier, the wholesale adoption of any new or available technology is not likely to enhance teaching effectiveness or the students' learning experience. Instead, the decision to use technology to create a more blended learning environment should rest on the assumption that its incorporation will achieve learning objectives at a comparable or increased level over traditional methods alone. Using online teaching tools fits this concern and the use of such tools can enhance the learning experience.

The CK system is designed to send one email per day for a period designated by the instructor. Currently, all seven programs offered on the CK web site consist of 50 keys; thus, 50 emails are sent, one each weekday for 10 weeks (holidays and break periods can be blocked so students do not return with an overwhelming amount of make-up work). Sending students daily emails not only increases the amount of time the student is likely to remain engaged with course material, it also seems to achieve the objective of breaking down complex concepts into manageable units of information for increased retention.

Although the advantages of this use of technology for students have been explicated, there are also advantages for instructors. A survey of secondary education instructors conducted by Bonk (2001) found that “a lack of interest in the Web for teaching was not an obstacle for these respondents” (p. 8). Instead, it was a lack of online support and an overall reluctance to adopt online resources due to a lack of training. Moreover, as other scholars have noted (see, for example, Motschnig-Pitrik, 2005) the use of technology-enhanced education places more responsibility on the instructor and often requires a higher level of time commitment to ensure the technology is working properly. These findings suggest the need to develop online methods that can be incorporated into classes with a minimum of training and to offer a comprehensive support system that aids in the program's effectiveness.

A detailed instructor's manual, entitled, *The Concept Keys Instructors Manual*, is available that presents an elaborated mixture of guidelines and optional activities designed to aid in creating ease of use from the instructors perspective (Powers, 2004). Included in the guide are in-class activities, homework assignments, and other

optional instructional strategies. In addition, online metrics in the form of student responses to selected FFT questions, an engagement index, quiz scores, and certification examination scores are available to the instructor.

Summary

The CK learning system contains a number of built-in learning factors designed to enhance the learning process: (1) bits of information; (2) bite-sized keys (chunks); (3) explanation; (4) motivation; (5) cognitive information; (6) behavioral information; (7) repetition; (8) multi-context imagery (priming). However, the complete CK learning system expands the potential for positive learner outcomes even further through the easy integration of the following aspects of learning support: (1) information delivery in the learner's application environment; (2) participation in overt repetition of keys over time; (3) responses to questions about the value of each key; (4) participation in weekly retention assessment activities; (5) self-selection of a weekly MIK with a stipulated application plan; (6) participation in enjoyable connecting events; (7) participation in team-learning activities; (8) complete clarity of exact expectations; (9) integration of learner self-selection of most important information over the complete set of 50 keys in each area; (10) certification via an online examination.

Teachers who decide to use a current program simply register at the CK web site and identify the program they wish to use along with start and delay dates (e.g. spring break). Students are sent to the CK web site just as they sent to the bookstore. They simply access the web site, locate their class, and purchase their program. Other teachers who author their own CK program (or have their students author their own CK program) utilize the CK Private Label option. They follow an easy guideline process of authoring that consists of determining the number of keys/micro-lessons in their specific topic area, generating the keys and then generating the micro-lessons, and inserting that information into the CK Author Template Software, which is available on the web site. The Private Label option requires the teacher to purchase the programs rather than the students (this cost can be subsidized by the institution or other sources) and provides the names, email addresses, etc. of the students. All teachers, whether using an existing program or authoring their own, receive *The Concept Keys Instructors Manual*, which allows blending the instructional strategy and activity options offered in this manual with their personal instructional decision-making. If a student leadership team is utilized, the instructor will train the leaders on the elements of the CK learning system and they will train their classmates or team members. All the elements for such preparation are available on the web site in the "Take the Tour" area.

The blended learning method provides additional support for students becoming engaged in the learning process. For example, one optional approach would have the students meeting on a regular basis in class, with the instructor serving the function of learning system coordinator. Such a dialogic approach has been shown to improve learning outcomes when employed in a similar way via learning tasks (Gravett &

Petersen, 2002). There are many options available to the instructor, some more appropriate to one level of learning than another. It should also be noted that the CK system is designed in the educational setting to serve a complementary role to classroom instruction. While the system is capable of sustaining a comprehensive training program in and of itself, the built in flexibility allows instructors to choose the option(s) that works for them and their classroom. The following case study will provide a foundational understanding of one application of the CK learning system as used in a medium sized southwestern university.

A Case Study

Procedures

Participants in the case study were primarily freshmen and sophomores attending a southwestern US private university who enrolled in an optional class entitled *Business and Professional Speaking* in the spring semester of 2003. Students ($N = 79$) were informed of the keys project as a supplemental part of the learning process in a class that would allow them to improve their skill in communicating clearly while the class focused upon larger traditional content issues in the course. Keys were scheduled to avoid delivery during spring break. Students formed themselves into teams and internally selected team leaders. The leaders of each team became the class advisory group and met with the instructor over lunch to discuss the project and to select the most appropriate support activities. In this case each student was expected to send an email to the teacher before noon on Mondays describing which of the preceding week's five keys was the MIK relative to the individual's view of self and projected future needs. Thus, at the end of the term each student would have self-selected 10 keys as MIKs on a personal basis. Students were informed that they would be tested over the keys at the conclusion of the project and the expectation was that they would retain each of the keys exactly and in the exact order in which they arrived. One point would be awarded for each MIK recalled correctly and half a point for each remaining key, with half a point deduction for each sequence error. The project was worth 30 points within the course grading scale of 300 points. Two bonus points were awarded to all students who correctly remembered 49 or 50 of the keys.

Furthermore, each of the five teams would have an opportunity to participate in a weekly contest designed to help the class remember each key, with each team having a different key. Team leaders determined the nature of the contest each week (e.g. skits, anagrams, poetry, song lyrics). The rules established by the instructor with the assistance of the team leaders were that the contest had to be fun, the focus had to help everyone remember the team's assigned key, each team would have no more than one minute of class time in the contest, the class would vote on which team did the best job (teams were not allowed to vote for themselves), and the members of the winning team identified by the leader as having participated meaningfully in the contest would all receive one bonus point towards determining their final grade.

Finally, the keys were discussed in class following each contest for a relatively brief period prior to discussing the regular class material.

Results

Feedback collected anonymously from students was overwhelmingly positive (4.8 average on a 5.0 point semantic differential using the bipolar descriptors of “not a valuable learning experience” and “definitely a valuable learning experience”). As expected, students were able to assess concept keys along the areas previously discussed. For instance, the communicating clearly program was seen by one student as helping him and the individuals with whom he communicates.

I felt that the concept keys were very informative; they brought up ideas of how you can correct your clarity in communication and who could possibly help you. Communicating clearly is something I have learned from these key points. They had a good layout of how you correct yourself as well. It not only helps me, but it also helps those around me.

Another anonymous student focused on the personal relevance and unique approach to obtaining this fundamental purpose of the CK program in the following message.

Concept keys, helps the student in two very important ways. The first is through the message. Giving concept keys allows the student to learn and be interested in another way than is not usual. It is not an overbearing professor yacking [sic] off all this information so that he can get his paycheck at the end of the week. It allows students to take the initiative to decide and then act on whether they want to learn more from the class or not. The second important way to improvement is the actual process. Over the internet is a very creative way to send school work. I believe it could also include a good way of adding a new adventure into the school process. In other words, this may give changes to the unchangeable cycle the school still consists of.

From this and similar comments, students felt as if the CK learning experience heightened their performance in the class.

Similarly, by being exposed to class content several times throughout the semester, another anonymous student response indicated, students felt as if they were provided with more opportunities to learn and, consequently, with more opportunities for code building.

Concept Keys was an interesting concept. The keys themselves were somewhat beneficial. They mainly reinforced issues which we discussed in class. This was not the part I found beneficial however. The keys were sent to me through the e-mail at one of the oddest times. I believe this was helpful because it was like having mini reviews 2 to 3 times a week. I find that the more I am exposed to a subject in small doses the more I will retain.

Not all responses were positive, however. Of the 53 students who responded to the request for comments, there were seven who expressed negative reactions to elements of the project. Two areas emerged from their responses to the question, “What did you find most negative about the CK learning project?” First, the need to remember all 50 keys was viewed as a useless and time-consuming exercise. “I don’t see any

value to having remember all these key things.” “It took too much time to remember all of these.” Similarly, one student raised the concern that given his/her learning style another approach to assessing student retention and understanding may be a more appropriate metric. “I’m not good at memory tests; ask essay questions next time and I’ll do better.”

Second, keys were seen as too simplistic, which may have led some students to not fully engage with the system or ignore the majority of the program.

Most of these Keys are dumb.

This is not education; my mom told me most of this stuff.

These Keys are ‘DUH’ stuff.

In addition to student perceptions of the utility of the program, memorizing keys was used as a metric in the current study. Of the 79 students in the class, 62 students remembered in the correct sequence either 49 or 50 of the keys, 10 remembered between 45 and 48, 5 remembered between 40 and 44 keys, and 2 remembered 8 keys. There were 13 relatively minor sequence errors across the 17 students with scores of 48 or below. Negative perceptions of having to memorize the 50 keys or the simplicity of these keys could have affected these results. However, student data were not matched with comments, thus leaving this an empirical question worthy of future research.

Moreover, memorization was considered important in the present case; memorizing appropriate behaviors and situations in which the behaviors should be exhibited has the potential to aid retrieval of information from long-term memory. It should be noted, however, that although a main objective in this particular use of the CK program was to memorize 50 keys to communicating clearly, memorization is not the only metric available to assess program effectiveness. While memorization is important, it is more important that students were required to engage in reflexive thinking prompted by FFT questions and MIK activities. Similarly, repetition through weekly tests was used to aid in the code building component of the chunking process. Another option not available during the time of the present case study is a certification process that tests student knowledge on a given competency at the end of a program and, if they are successful, provides certification in that competency. Given that the CK system is offered as an online educational system it is completely customizable. Other metrics, prompts, and requirements can be built in by instructors, depending on the activities they select or create.

Conclusion

Being considered competent in any interaction is largely based on communication behaviors. These behaviors are based on the skills one displays in any given interaction. The importance of such skills necessitates that communication instructors create innovative methods that utilize the strengths of different teaching methods to come to a blended learning protocol that works with a given course and students in that course.

The CK system is a focused approach to classroom interaction grounded in educational theory (i.e. chunking, priming, active learning) that blends web-based education with face-to-face instructor direction and support. CK provides students with small bits of information over a long period of time, culminating in a vast store of knowledge about a set of skills and how to perform these skills in specified contexts. Along with daily commentary, or keys, this method has students rate these keys according to personal relevance. Additional classroom activities are also available which add to the student–teacher interaction and increase the chances of information retention and skill.

CK is an innovative approach to teaching and learning communication skills that leverages the concepts of chunking and priming, with the added benefit of learning support systems within the more traditional learning model, to provide greater opportunity for teachers and trainers to affect the quality of participant learning outcomes. CK is based on the notion that small units of information about complex concepts that are systematically delivered into the most appropriate learning environment within a meaningful support system provides the greatest opportunity for learners to acquire, retain, apply, and improve communication skills.

The CK blended learning system has great potential to enhance learner skill outcomes in that the system helps students build a code for effective communication-related skills. As Gobet and Simon (1996) suggested, this type of code building develops a rich expertise in an area and the ability to recognize patterns among the information. Because the separate keys provide reinforcement and repetition of basic concepts, the student is able to build chunks of information related to effective behavior and is better able to access this information from memory. CK also incorporates the principle of priming in its structure. One way that CK uses priming is by delivering stimuli that help students access their chunks. In addition, CK uses case studies and in-class exercises to build an association between the keys and best practice communication behaviors. This type of training builds a system of associations that can be readily accessed or primed when the student faces a similar situation. Moreover, recent technological evolution in the educational arena has opened a new door for teachers to affect the quality of education for their students. CK provides an exciting, innovative, means of incorporating technology into instruction and skill development that is consistent with general learning objectives.

It should be noted that more research is needed to further validate these initial findings. Experiments in which similar classes are either engaged or not engaged with this program would be a welcome invitation. However, it is important that we do not discount the results provided above just because the CK method is new. For instance, new textbooks and activities devised by teachers are not necessarily put through such scrutiny. In fact, our evaluation system, at least at the college level, is based on student perception. Furthermore, our assessment system is based on student retention, on which CK is also based. One warranted criticism based on this metric is that further validation in terms of the longitudinal effects of such a system (i.e. can student's retain keys over a long period of time) is needed to fully evaluate the

effectiveness of our method. However, an outline of an innovative way to teach skills deemed necessary in everyday life has been provided.

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Note

1. Dr Will Powers, second author of this manuscript, identifies a potential conflict of interest as required by this journal and described in detail in the *Uniform requirements for manuscripts submitted to biomedical journals: writing and editing for biomedical publication* (www.icmje.org/#conflicts). Dr Powers, a Full Professor, former Chair of the Department of Communication Studies, and Assistant Dean in the College of Communication at Texas Christian University, Fort Worth, Texas, USA, acknowledges that he created and spent five years in testing, research, and development of the online learning system discussed in this manuscript. He founded Concept Keys Inc. to provide a basis for making the online learning system available to trainers, teachers, and content experts around the world. This manuscript identifies the theoretical and research foundation underpinning and supporting various aspects of the learning system and includes a small case study application of the system as an instructional strategy in a college class during the latter segment of the developmental period. Every effort has been made to counter any bias that may have emerged during the description and interpretation of facts associated with the case study. The first and third authors have no connection in any form with the Concept Keys enterprise and were drawn to initiate and co-author this manuscript solely for standard academic purposes and reflect the highest level of academic, scholarly integrity.

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