Using Interrupted Video Case Studies to Teach Developmental Theory: A Pilot Study

J. W. Anderson
Department of Family and Consumer Sciences • Illinois State University

Dr. Bill Anderson is currently an Associate Professor of Family and Consumer Sciences at ISU. Prior to coming to Illinois State in 2006, he taught educational and developmental psychology, music therapy techniques, and guitar for music therapy students at the University of Alabama. After several years in Music Therapy, he joined the faculty at ISU where he teaches courses in adolescence/early adulthood, couple relationships, and research theory application. He is a *Family Life Educator*, certified by the National Council on Family Relations and his work has been published in *Psychomusicology*, *Review of Disability Studies*, and others.

Sarah Bradshaw
Department of Family and Consumer Sciences • Illinois State University

Sarah Bradshaw is a project facilitator for the Champaign Area Relationship Education for Youth (CARE4U) program run though Illinois State University in Champaign County. She has a Master's in Human Development and Family Resources and a Bachelor's in Family and Consumer Sciences Teacher Education from Illinois State University.

Jennifer Banning
Department of Family and Consumer Sciences • Illinois State University

Dr. Jennifer Banning is an associate professor in the Department of Family and Consumer Sciences at Illinois State University, where she also serves as Director of the Lois Jett Historic Costume Collection. Her research interests include sustainability, fashion history, and the scholarship of teaching and learning.

This study was designed to determine the usefulness of interrupted video case studies in providing vicarious, but meaningful, application of classroom learning, in this case, foundational theories of the human development field. Participants were students in a graduate Human Development course where a pre-/post-test format was utilized. The effect was significant as all participants' posttest score improved. Also, pattern-matching results indicated an increase in complex levels of thinking across students' work, further validating post-test scores. Results here serve also to confirm Egleston's (2013) idea that an interrupted video case-study, could address all limitations typically associated with case-based instruction.

Interrupted Video Case Studies: Practicing Theory in a Graduate Human Development Course

It is generally agreed that the value of fundamental course content is largely as an essential means to deeper learning. That being, learning to successfully *apply* that content to problem-solving and to *transfer* this knowledge to future relevant, more meaningful applications (Anderson & Krathwohl, 2001; Mayo, 2002). Often, the most significant improvement teachers can make is giving students more application and real-world observational experiences related to the subject material (Fink, 2003). However, less class time is typically available for this additional, more meaningful, learning (Mayall, 2010). When authentic application is impractical or simply not possible, other forms of classroom doing and observing can be valuable (Fink, 2003). Utilizing case studies can help generate an opportunity to apply content that students might not have otherwise (Harvard Law School, 2014; Herreid, 2007a; Mayo, 2004). Such an exercise can also serve to make abstract concepts more comprehensible. Case studies can aid both of these goals, having not only been found to promote critical thinking (Herreid, 2004; Kantor, 2013; Mayo, 2004) but also to be an effective means of applying explanatory theories (Egleston, 2013; Irby, 1994; Mayo, 2004). Certainly, case-based learning is an established method for the understanding and application of theory in introductory psychology (Mayo, 2002), human developmental (Cabe, Walker, & Williams, 1999), nursing (Thomas, O'Connor, Albert, Boutain, & Brandt, 2001), and business (Brunner, Gup, Nunnally, & Pettit, 1999).

Case Based Instruction (CBI)

Existing research indicates several robust reasons for utilizing CBI in the higher-education classroom (i.e. Herreid, 2007b; Mayo, 2002; Thomas et al., 2001). These include: creating the need to know, raising the level of critical thinking skills, teaching in context, and, perhaps most importantly here, connecting theory and practice (e.g. John, 2002). "Within case-based pedagogy, the cases become teaching tools that serve as a context for making meaning of concepts presented during instruction… thus making understanding transparent," and more deeply relevant to the specified learning objectives (Ulanoff, Fingon, & Beltran, 2009, p. 125).

Although case studies are established and effective teaching tools they are not without recognized limitations. If the student is presented with a case study as a set of questions, what is very likely being assessed is simply the student's ability to locate the predetermined answers straightforwardly available within the case itself. In such an instance, "students do not learn where to go to ask the appropriate questions; they learn to answer those asked by others… they learn that the answers are in front of them" (Egleston, 2013, p. 101). Furthermore, it appears that many currently available case studies now have student responses, instructor write-ups, and class presentations readily available online. So, instructors must be aware of this possibility. Lastly, case studies can potentially be a largely passive activity, same as any other form of presentation (Herreid, 2005), but CBI can also, with time and intentional planning, cast the learner in the more desired active role (Habron & Dann, 2002; Harvard Law School, 2014; Mayo, 2002). Surely, students learn more when they are authentically engaged in a process (Egleston, 2013) that is "not hierarchical but rather relational and even interactive" (Fink, 2003, p. 32).

The Interrupted Case Study (ICS)

In 1994, Irby described a methodology for addressing the above case-study limitations and moving learners to a more active role. In c*ase-iterative teaching*, pieces of information are presented in the order in which they originally occurred and students were then asked to think aloud and advance the discussion. Serial questioning, justification, and interpretation continued until all relevant information has been shared or a consensus has been reached. In addition to being more dynamic, this method also addressed one previously mentioned limitation as the case is developed in real time with readily available answers for students to cite or easily download (Egleston, 2013). Several others have more recently described successful teaching and learning where the case is given to students in selected, organized parts (e.g. Herreid, 2005; NCCSTS, 2014; White, et. al., 2009). This *interrupted* case study (ICS) uses progressive disclosure of information rather than opening the entire story line at the outset. It is rather a progressive discovery viewed as problem-based learning over time. Also, Herreid (2005) explained that the ICS approach provides additional structure to the conversation, an important point for those students who do not readily engage in an unrestricted, exploratory discussion.

In utilizing interrupted case studies, the instructor must risk no longer being the final authority, but rather a facilitator, guiding a more flexible discussion at a varying pace (Brunner et al., 1999; Mayo, 2002). In this role, she or he must guide students in "the direction of inferences and conclusions, rather than providing them with ready-made answers" (Mayo, 2004, p. 143). As "critical thinking can't be just the content of the discipline *but must also be* the way we go about problem-solving and asking questions" (Herreid, 2004, p. 12), it is the student rather than the instructor who should lead such learning (Brunner, et al., 1999; Kantar, 2013). Of course, students still employ textbook material and call upon personal experience (Egleston, 2013), but they are also encouraged to think aloud, actually rehearsing professional thinking (e.g. Fink, 2003; Irby, 1994), and even to imagine or predict future effects from the case (Herreid, 2004, 2005). Still, and although all effective teaching is more than a simple information exchange, if the instructor is any less directive with ICS, students could possibly perceive cases as an artificially cumbersome way of learning.

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Purpose of this study

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Although undergraduate student perceptions of case-study based learning and instruction have often been explored, actual student learning gains have received noticeably less attention (Lundeberg & Yadav, 2006; White et al., 2009). Also, and though others have found case-based instruction beneficial in graduate education to specifically increase critical thinking and engage in more authentic learning (e.g. Casotti, Beneski, & Knabb, 2013; Habron & Dann, 2002; Kantar, 2013; Ulanoff et al., 2009), existing research concerning CBI in graduate education is likewise limited.   Still, teaching students to utilize and apply theoretical models helps not only to intentionally relate theory to practical situations (Mayo, 2002; Noorminshah, Mirabloghasemi, Mustaffa, Latif, & Buntat, 2013), but also how to better understand how professionals develop and articulate their ideas (Herreid, 2004).

With this in mind, the current study was designed to determine if the use of interrupted video case studies could provide vicarious (e.g. Fink, 2003), but meaningful, opportunities to apply classroom learning, in this case foundational theories used in the human development field. Also, could the ICS assignments be assessed utilizing a common language for course objectives, rubrics, and feedback? Concerning this last question, because the overarching goal of this study was to determine if ICS could improve learning, the language of Bloom's Revised Taxonomy (Anderson & Krathwohl, 2001) was used throughout, in course objectives, assignment instructions, and feedback, as a hierarchy of cognitive skills.

Methods

Participants were students (*N* = 7) enrolled in a graduate Human Development course. A slight majority of the students (*N* = 4) had an undergraduate background in Human Development and/or Family Sciences. Other degrees represented were: psychology, social work, and special education. In order for students to speak a common language, basic concepts of the developmental theories of Piaget, Perry, Bronfenbrenner, and Erikson were refreshed at the beginning of the semester, along with the course's encompassing idea of *developmental niche* (Super & Harkness, 2002).

Pre-/Post-test

Following IRB approval, a pre-test consisting of 39 understanding/comprehension level (e.g. Anderson & Krathwohl, 2001), multiple-choice questions was administered. Because the low number of participants could clearly result in low statistical power, a quasi-experimental, single-group pre-posttest design was utilized (Bishop-Clark & Dietz-Uhler, 2012; Wilson-Doenges & Gurung, 2013). This design would also serve to moderate selection bias and better support internal validity as students are compared to themselves (Gurung & Wilson, 2013).

Over an eight week period following the pre-test application, students viewed the documentary *56-Up* (Apted, 2013) as an interrupted video case-study. *56-Up* followed several children from the time they were seven years old in 1964, revisiting them every seven years until age 56 in 2013. Students were initially introduced to the documentary and three individual participants were chosen to observe as the semester progressed. Following an ICS format, students worked "with incomplete data, made tentative hypotheses, collected more information, refined *their* hypotheses, *and* made more predictions" (Herreid, 2004, p. 13) in weekly reflective essays and class discussions. Using the assumptions, concepts, and language of the previously identified developmental theorists, students described and applied relevant theoretical positions to anticipate growth and change as a collection of unique lives progressed. At the conclusion of *56-Up*, a post-test, identical to the pretest, was administered to all participants.

Pattern Matching

Pattern-matching is recognized as the primary procedure for theory testing with case-studies and is specifically suited to reconcile mixed methods and data sources in case study research and to enhance the rigor of the study (Almutairi, Gardner, & McCarthy, 2014; Yin, 2009). It was used here to specifically compare the empirically yielded results of the pre/post-test scores with the qualitatively coded essays, using a pre-identified and established theory (e.g. Almutairi et al., 2014; Trochim, 2006; Yin, 2009). Bloom's Revised Taxonomy (Anderson & Krathwohl, 2001) was used for theoretical matching and was anticipated to yield very similar results to that indicated by the pre-/post-test.

Using principles of open coding (Strauss & Corbin, 1997), student essays # 1, at target age 7, and #8, at age 56, were coded to determine pattern-matching (Almutairi et al., 2014). Essays included student descriptions of the target individuals using appropriate theories, reviews of their most recent predictions for the target, and their predictions for the next seven years. Bloom's Revised Taxonomy (Anderson & Krathwohl, 2001) was utilized as coding categories as follows: 6 – Creating, 5 – Evaluating, 4 – Analyzing, 3 – Applying, 2 – Understanding, 1 – Remembering. Also, key word

descriptors for each taxonomy level from the *Quick Flip Questions for the Revised Blooms Taxonomy* (2001) were used as coding concepts in order to better identify progress toward more complex reasoning in the assignment, understood as a pattern of moving from labeling, explaining, or interpreting toward distinguishing, inferring, prioritizing, and predicting (e.g. *Quick Flip Questions for the Revised Blooms Taxonomy,* 2001).

Intercoder reliability, of three independent coders, would be refined through multiple reviews of the student essays. Consistency would then be determined for the two groups of student essays by using the Intra-class correlation coefficient function of SPSS v. 20 to determine a Cronbach's alpha coefficient of reliability. A score of .80 would be deemed reliable (Bishop-Clark & Dietz-Uhler, 2012).

Results

Pre-/post-test scores were analyzed using a paired-samples *t*-test. The effect was significant, $t(6) = -7.990$, $p = .000$. For all participants the posttest score was higher, moving from a mean pretest score of 18.86/39 (SD – 3.48), or 48% to a posttest mean of 26.43 (SD – 3.25), or 68%. This indicated a mean student improvement of 19.87% (SD – 2.507).

Intercoder reliability, of three independent coders, was computed to determine coding consistency/reliability. After two coding passes, analysis utilizing Cronbach's alpha yielded scores of $a = .856$, $p = .01$, for student essay #1 and $a = .898$, $p = .01$, for essay #8. Such high correlation indicated a high likelihood of pattern-matching and a strong construct validity (e.g. Trochim, 1985; Yin, 2009) as well as an increase toward higher, more complex, levels of thinking across student's written essays, further explaining, and validating, pre-/post-test results. Table 1 shows changes in taxonomy levels (i.e. Anderson & Krathwohl, 2001), with #4, *analyzing* (i.e. comparing, inspecting, discovery), and #5, *evaluating* (i.e. interpreting, prioritizing, justifying, explaining), both approximately doubled at the final essay.

Table 1

Taxonomy level of student thinking reflected in weekly essays

	Essay 1 - 14-Up	Essay 8 - 56-Up
Creating	14.7 %	12.3 %
Evaluating	8.3 %	15.7 %
Analyzing	15.8 %	31.3 %
Applying	9.1 %	6.6 %
Understanding	16.5 %	6.2 %
Remembering	35.6 %	28.9 %

Discussion

As mentioned, several have reported that case-based instruction does indeed move learners to a more active role (e.g. Egleston, 2013; Mayo 2002) and thereby increase critical thinking (e.g. Herreid, 2004). However, student learning gains in case-based instruction have been difficult to assess, have seldom been measured in research, and have received less attention than the pedagogy itself (Lundeberg & Yadav, 2006). Findings from interrupted case studies are far more

limited (e.g. White et al., 2009). Results here indicated an increase in learning as the improvement between pretest and posttest was significant. Also, pattern-matching (Yin, 2009) with Bloom's Revised Taxonomy (Anderson & Krathwohl, 2001) of the student's qualitative essays not only corroborates the improvement seen in the posttest but indicates student movement toward a more complex thinking. This deeper thinking also indicates a more active student role in their own learning, as seen in the movement from understanding, applying and analyzing (i.e. explaining, selecting, utilizing, and distinguishing) to analyzing and evaluating (inferring, discovering, prioritizing, justifying). Overall, the use of interrupted video case study was successful.

56-Up as a Video Case Study

In 2004, Mayo stated, "a promising direction for case-based instruction might involve the combination of video technology and case method of teaching" (p. 144). This current study did exactly that. Mayo (2004) also cited two explicit limitations with case-based instruction purposely addressed here. First, most case studies are limited in length and therefore may relate to only a few course concepts. Apted's (2013) documentary reflects real lives lived over a 49-year period making it possible to apply multiple theories across the lifespan. The student created a snapshot from which to begin when they first met their target at seven years of age. At this point the work of Piaget, Erikson, and the concept of developmental niche' (Super & Harkness, 2002) are easily relevant and provide the language for student's explanations and predictions, as well as informed points for future comparison and contrast. As the varied lives recorded in the documentary progress, students continued to utilize a variety of theories to describe, reflect, and predict at each target age. At age 14, the work of Piaget and Erikson were the most widely utilized in student insights:

> I predicted that Suzy would be floating around *formal operational thought* by age 14 but some responses lead me to think that she hasn't made it, but there are environmental factors that we are seeing for the first time.

> Another reason why I believe Neil is exhibiting signs of *formal operations* is he is able to speculate about the future and about what is possible.

> … based on these observations, one can propose that Nicolas had fully reached the *intimacy* described in Erikson's psychosocial development.

However, at this point of adolescence and emerging adulthood, the work of Perry (1999) became more visible as well. One student wrote:

> Nicolas also demonstrated a form of thinking between *relativism* and *commitment*… however it depends on the person's developmental niche and personality. Nicolas was able to prioritize the options he had…

This pattern continued until students completed the assignment with the documentary individuals at age 56:

> Nicolas (at 56) stated he wanted to "train his students to be useful contributors to society," which is a statement directly portraying *generativity.*

> Neil (at 56) said that he was absolutely sure that his faith helped him through difficult times. Neil has found a Bible group… along with doing his work as a politician and working in the church again *shows signs of, I believe, generativity. But then we have been describing Neil this way since he was 28 haven't we?*

Secondly, Mayo (2004) reported that because many case studies are fictional, students may likely find it less valuable than real-life scenarios. Results here indicated, again in agreement with others (e.g. Habron & Dann, 2002), that narratives of actual events appear to be perceived by students as more engaging and meaningful. Also, actual case studies have ambiguities that create a richer story. Because of this, "The audience never knows how it will all come out..." (Herreid, 2007b, p. 48), but "there is no better way to understand a situation and to gain empathy for the characters than to hear them speak in their own voices" (Herreid, 2007b, p. 46). This interest and responsiveness is evidenced in the excerpts below where they can be seen as strongly desirable elements of case studies used for teaching. Student comments included:

> I think *this is the Suzi* (at 42) *that has been inside for a long time* and *she is just now letting her guard down and other people in.*

> Was I thinking theory or not seeing past *what I was hoping for Neil* (at 42).

> *I'm not sure I know what to make of this.* Neil (at 42) says that people thought he was a success and that when people wrote him they said that they could see something in him that Neil couldn't see in himself. *I too see what they see in him.*

Why use Interrupted Case Studies in Higher Education

As previously stated, case studies can commonly provide an opportunity to actually apply course materials (Herreid, 2007a; Mayo, 2004) in order to make abstract concepts more comprehensible (Herreid, 2004). However, and more specific to this study, they are also useful in creating the need to know, connecting theory and practice, and raising the level of critical thinking skills (e.g. John, 2002; Mayo, 2004).

Creating the need to know. Students regularly mentioned an ongoing curiosity about the documentary's participants. Because, "a learning experience changes the degree to which students care about something... in the form of new feelings, interest, or values" (Fink, 2003, p. 32), we perceive the desired *need to know* as perhaps better understood as emotional rather than cognitive. According to some, without a change in caring, or value, no significant learning occurs (Fink, 2003; Krathwohl, Bloom, & Masia, 1964). A caring need to know (e.g. John, 2002) was often visible in student curiosity in *56-Up*.

> *I love the fact* that Nicolas (at 21) said he does not worry about not achieving and he just wants to see where he ends up... *I'm excited* to see where Nicolas goes next.

> ... Suzy (at 21) will not know exactly who she is. However she could be a dark horse and surprise me. *I cannot wait to find out!*

Caring about the central characters of the case involved an apparent higher level of cognition and involvement on the student's part (e.g. Barkley, 2010; Krathwohl et al., 1964). Barrett-Lennard (1981) described such concern as a complex knowing, reporting that such knowledge of others implies a discernment and understanding of individual and unique qualities that come "not from a detached external view but from a position as participant-observer" (p.91). Consequently, the previously mentioned need-to-know process could be best understood as not only involving cognitive perspective-taking, but affective sensitivity as well. The need to know of the participant-observer could be seen in the following:

> I believed that the possibility for a mental illness would overtake him (Neil at 35) or control more of his life than he, *or I would like.*

I would like to predict that his (Neil at 42) life becomes a little more stable*, but I'm not sure if that is a true prediction or just a hope.*

I might be thinking this way because of the way I feel about my parents, so *I may be assuming his experience is reflective of mine*. I think that the distant relationship Neil has with his family might be for *a reason that we have yet to see* in his interviews. The Neil in 42-*UP* seemed less poetic… I got the impression that he might be using a drug therapy to manage his illness. I also *didn't really see the "sparkle of the 7-year old eyes"* some people in class have mentioned. …felt like meeting a whole new person in a way. *I hope he remains in good health, but I am worried.*

Connecting theory and practice. Another previously noted reason for using case studies in higher education, and of particular interest here, is the application of theory. Again, John (2002) shares a common area with Herreid (2007b), as the latter's necessary *pedagogic usefulness* that must serve specific, pre-established course objectives easily includes the former's connecting theory to practice. Undeniably, this combination relates effortlessly to the course and assignment referenced throughout this study. This was quite evident in student essays and became more pronounced as the case study assignment progressed. As, "many students do not make the important connections between and among the facts they learn in classrooms and the larger system of ideas reflected in an expert's knowledge of the discipline" (Anderson & Krathwohl, 2001, p. 42), this connection was the primary goal of the interrupted case study assignment. The following, as well as several previous excerpts, indicate this pedagogic usefulness and connection:

> Cognitively, Suzy (at 7) should soon be well into *Piaget's formal operations*, though I predict she will have a noticeable *imaginary audience.*

> She (Suzy at 21) listened to her parents and did what was expected of a child in her environment. Now that she is an adult, she is still unsure of who she is independently of her parents. *Foreclosure? Isolation?*

> Suzy (at 28) *exceeded all my expectations* because she was a wife and a mother. Perry stated that commitment in *relativism* is recognizing choices, accepting responsibility for their consequences, and willingness to accept others' right to their own choices. There is full recognition that choices restrict one from some choices and open the way to others… through a gradual realization that a particular direction is being taken. Suzy may continue to reaffirm or reject old beliefs; either way, *the decision is based on a conscious consideration of alternatives as opposed to the blind acceptance of the dualist.*

> *Nicholas* (at 21) *is obviously in Perry's commitment*… [which] states that the individual looks at priorities and commits fully to one; however if convinced, may be inclined to change his or her mind.

Raising the level of critical thinking skills. Lastly, the finding that case studies can be used to build critical thinking skills (Herreid, 2004; Kantor, 2013; Mayo, 2004) was seen here as well. As, "Factual knowledge exists at a relatively low level of abstraction" (Anderson & Krathwohl, 2001, p. 45) students were encouraged to elaborate, infer, interpret, imagine, and predict. The student comments below exhibit some of these qualities and evidence thinking noticeably beyond a simple understanding or application level (e.g. Anderson & Krathwohl, 2001). Particularly by the target ages of 35 years and later, students seem to have a much better developed, implicit understanding that they are only getting partial information, only a piece of the picture.

> With the approaching change in her family's oldest generation, Rupert's new business, and empty house, Suzi (at 42) has a lot of challenges coming her way. *The more I watch these episodes, the more I realize that anything can happen in a seven year span.*

I don't think that Suzy will be fully into the next *psychosocial* stage by 56, because the *questions and answers included were directed at a reflection of the past* and very little was discussed of the future. So, naturally she appeared focused on her past.

Results here indicated, in agreement with others (e.g. Casotti et al., 2013; Herreid, 2004; Ulanoff et al., 2009), that interrupted case-based instruction is indeed beneficial in graduate education by specifically increasing critical thinking. This is also very likely what is reflected in Table 1, with the notable increase from Anderson and Krathwohl's (2001) Applying/Analyzing to a greater average usage of Analyzing/Evaluating levels over the eight weeks involving the interrupted video case study.

Conclusion

The use of *56-Up* as an interrupted video case study with graduate human development students provided the needed vicarious, or secondhand, experience of applying course content to meaningful problem solving (e.g. Fink, 2003). As a result, the process resulted in an improvement in student learning. Furthermore, results here confirmed Egleston's (2013) idea that a progressive case-study, in this case an interrupted video case-study, could address all limitations typically associated with case-based instruction. Moreover, and although some (e.g. Egleston, 2013) have reported that students have expressed some dislike for the less structured format that might accompany case-based learning, that was not an issue in this current study. At the conclusion of the assignment, and in agreement with Mayo (2002), students here were very favorable concerning CBI, as well as the interrupted format.

Nevertheless, this present study should be viewed as exploratory. Although results were positive, the small sample size would certainly limit any generalizability. Also, as with similar studies (i.e., Mayo 2002, 2004), because the author served in the dual role of teacher and researcher in the present experiment, despite efforts to control factors that could have influenced the results, future replications should include awareness of the potential for experimenter bias.

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Gauisus is the internal, peer-reviewed scholarship of teaching and learning (SoTL) publication at Illinois State University (ISU). Its purpose is to provide instructors writing about their teaching and learning a local but peer reviewed publication outlet and to offer other instructors and students an accessible publication to read to obtain a sense of, and learn from, some of the scholarly teaching and SoTL projects conducted by their colleagues on our campus. The name, *Gauisus* means glad, gladly, or joyful in Latin, as in the Illinois State motto/logo, "Gladly we learn and teach."

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