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# Using the Jigsaw Method for Meaningful Learning to Enhance Learning and Rentention in an Educational Leadership Graduate School Course

By Alejandro Garcia, Ed.D, Jesus Abrego, Ed.D & Reguenes Robert, B.A.
*One West University Blvd.*

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*Keywords: higher education, jigsaw method in teaching, teaching and learning, blogs.*

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# Using the Jigsaw Method for Meaningful Learning to Enhance Learning and Rentention in an Educational Leadership Graduate School Course

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## I. Introduction

Despite the advent of online and mobile technologies, teaching and learning in institutions of higher learning has not drastically changed in decades, Pedagogies often ardently remain the same. According to Hurtado et al., (2012), 45 percent of the faculty in higher educational institutions report the continued practice of the lecture as their instructional delivery method. Yet, a large body of evidence has shown that this instructional delivery method is less effective than other pedagogies, which actively involve students and give them more control and accountability over their own learning (Pascarella & Terenzini, 2005). What is needed for students, in order to become successful learners, are other pedagogies which encourage and promote active learning and meaningfully social interaction with peers and their instructor (Pascarella & Terenzini, 2005).

*Author α: The University of Texas at Rio Grande Valley Brownsville Campus One West University Blvd. Brownsville. e-mail: alejandro.garcia@utrgv.edu*
*Author σ: College of Education The University of Texas Rio Grande Valley Brownsville Campus One West University Blvd. Brownsville. e-mail: chuey.abrego@utrgv.edu*
*Author ρ: College of Education Brownsville Campus One West University Blvd, Brownsville. e-mail: btown200386@yahoo.com*

## II. Review Of Literature

The Greek teacher and philosopher Socrates, taught his students primarily through dialogues, in which his students explored topics through questioning. Students were active learners as opposed to passive recipients of knowledge. They were expected to explore, make connections and create new meanings. Others such as Seneca encouraged students to teach one another cooperatively. He was known for saying that when someone teaches, he would learn twice (Johnson, Roger, Johnson & Smith, 1998). Further along in history, philosophers such as Johann Comenius otherwise known as the "father of modern education", have advocated pedagogies that are student centered (Henry, 2010). Comenius is commonly known for this method of teaching through the senses. He believed that learning is an active function which needed more than just text, but illustrations as well. In addition, Comenius believed that students would gain a great understanding by learning from their peers (Johnson, Roger, Johnson & Smith, 1998).

Cooperative learning has long been an established pedagogy throughout the ages. In contemporary times, others such as Lev Vygotsky have proposed that "cooperative efforts to learn, understand, and solve problems are essential for constructing knowledge and transforming the joint perspectives into internal mental functioning" (Johnson, Johnson & Smith, 1998, p.4).

### *a) Cooperative Learning*

Human society has become more and more dependent upon others for survival. Humans for example have been dependent upon others daily for their energy, food, transportation, and medical needs, etc. Humans have learned to cooperate with one



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another and this spirit of cooperation has evolved into a commonly known instructional method, cooperative learning (Bulut, 2010). Cooperative learning is a method in which small groups of four to six students work together to accomplish a common educational goal. Students are equally accountable and share the rewards, recognition or the failures. Success or failure is contingent upon collaboration of individual efforts (Slavin, 1989). The theory behind cooperative learning accepts that students seem to work harder on tasks for which there are obvious rewards and they will not perform acceptably on those tasks that deliver a reprimand or no reward. (Johnson, Johnson & Houlbec, 1994). Cooperative learning is intended to deliver motivations for group members when they participate in a group wide task. "Cooperative learning is employed by many educators and psychologists as a new instructional method because it has considerable effect on student's academic achievement, self-esteem, motivation, and attitude toward classes, as well as on retention and class socialization "(Johnson & Johnson, 1985, p. 113).

Cooperative learning demonstrates its' strength from the three basic elements of positive interdependence, interaction, and accountability. The first element, positive interdependence is a powerful binding force when each group member recognizes that their efforts as a collective make a difference and that if one success or fails, all will succeed or fail (Johnson & Johnson, 1985). Teams rely upon each other to provide a level of proficiency and if a team member performs poorly, the whole group effort will suffer and their evaluation will result being graded as substandard. The second element, of interaction, is promoted when students realize that there is strength in numbers by the group interdependency and therefore become better engaged at the task at hand both individually and cooperatively. Each member understands the importance of sharing ideas and resources, helping and inspiring each other. The last important element, accountability is realized through their interdependency. Both individual and group accountability are present in cooperative learning. Individual accountability exists when the performance of each student is evaluated by the group in order to decide who needs additional support in learning the task at hand. Group accountability exist because all team members are responsible to the whole group, consequently groups rely upon each other to do their part. By participating in cooperative learning, each team member becomes stronger and gain confidence and competency (Johnson & Johnson, 1985).

*b) Benefits of Cooperative learning*

Cooperative learning as a method of instruction is beneficial for students (Johnson & Johnson, 1985). It brings about positive emotions since individuals have a sense of belonging and accomplishment. Students become more satisfied learners in cooperative learning situations as opposed to the traditional lecture. Students in cooperative groups tend to show "…higher academic achievement, greater persistence through graduation, high-level reasoning and critical thinking skills, deeper understanding of learned material, greater time on task and less disruptive behavior in class, lower levels of anxiety and stress, greater intrinsic motivation to learn" (Felder & Brent, 2007, p. 1). In addition, learning cooperatively enhances learning for weak students since they may quit when confronted with difficulty. Whereas, in cooperative situations, these students are encouraged and supported by their teammates. Stronger students on the other hand are aided by being motivated to not skip any sections by feeling the responsibility of belonging to a team (Terenzini, etal., 2001).

*c) The Jigsaw method*

The Jigsaw method is one cooperative learning strategy proposed by Aronson (1971) has been employed by hundreds of school across the nations and has been heralded with much success (Johnson & Johnson, 1992). This instructional method divides a block of knowledge such as a book chapter or unit of study into smaller manageable chunks. Teams of individuals are formed with each person being responsible for a specific chunk of the topic, subsequently becomingan expert for that chunk of knowledge (Aronson, et al., 1978).Typical elements that are outcomes of the jigsaw method are: positive interdependence, individual accountability, promotion of peer interaction and the development of social skills (Weidman & Bishop, 2009; Johnson & Johnson, 2008). According to Weidman and Bishop (2009), the jigsaw method typically follows a specific sequence of events. The first step occurs when the instructor has decided upon a topic to be researched or presented, then afterwards students are then divided into small cooperative groups. This small group, according to Aronson (2000) is typically referred to as the "Home Group". Secondly, students are assigned a smaller unit or chunk of body of knowledge and "…each participant is responsible for solving a portion of the problem at hand, while in collaborative situations, the participants are mutually involved in shared activities; they must coordinate their efforts if they are to solve problems together" (Lipponen, 2002, p.65). In essence, each participant becomes the expert. The third step is for each expert group member to "…discuss the nuances of the subject with their teams to teach their colleagues" (Kordaki & Siempos, 2010, p.68). The final step is for the learners to assess their peers (Weidman & Bishop, 2009; Kordaki & Siempos, 2010).

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*d) Benefits of the Jigsaw method*

The jigsaw method offers a variety of benefits for the students such as an increase in active participation in the course, self-esteem, and focused attention spans (Kordaki & Siempos, 2010).

The jigsaw method allows for the creation of an atmosphere where the student actively participate more in the course and takes ownership over their learning (Hedeen, 2013). Students also become more interactive with each other compared with traditional methods of instruction. As a result of this increased interaction, greater social bonds are promoted within the group. (Millis & Cottell, 1998). The instructor acts as a facilitator or a coach rather than a lecturer or deliverer of knowledge with students being knowledge gatherers and synthesizers (Tamah, 2007). Students are able to deeply understand the lessons when they learned it in smaller meaningful chunks (Huang, et al, 2014).

This method is also good for students in the affective domain. The jigsaw method implementation was revealed in studies that students were more eager to participate in classroom events while demonstrating a greater sense of self confidence and self-worth (Mengduo & Xiaoling, 2001; Al-Salkhi, 2015; Aronson & Patnoe, 2011).Thus according to Aronson and Patnoe (2011), student academic performance and an affinity learning increased.

Another benefit to using the jigsaw method is an increase and focused student's attention spans. This may be due to students held responsible to one specific chunk of information and having accountability to others in learning the topic at hand. Students seemed to become better engaged and aware of classroom activities. It was easier for them to communicate ideas since they were more confident and aware. Students were listening attentively and responded easily to the ideas of their peers and friends more immediately (Mengduo, & Xiaoling, 2001)

*e) Blogs*

A delivery method for the jigsaw cooperative method in an online class is the use of a blog in a learning management systems such as Black Board. The term blog is an abbreviation for "weblog". In simple terms a blog is an online journal where a person can share information with others on a mutually accessible website. (Bouwma-Gearhart & Bess, 2012).

In the classroom, the blog is a medium which allows teacher to student, student to student dialogue to occur. Students are able to post information and share it with their peers. In a study conducted by Bartlett-Bragg (2003) the results revealed that blogs were "…. a joint activity through which students enjoy communication with each other and create an informal network. This communication is enjoyed by students and encouraged by academics. It allows a process of 'mind sharing (p.393).

*f) Benefits of Blogs*

Blogs have proven to be beneficial in educational environments. For example, Ferdig and Trammel (2004), revealed four beneficial aspects of from student blogging. The first one was that blogging assisted students in become experts in the area being researched. This is very similar to the advantage of the jigsaw method. Williams and Jacobs (2004) concluded that, students were able to learn equally well from participating in blogs as opposed to teaching from the instructor or a textbook. Secondly, students were able to become invested in their work by taking pride or having a sense of ownership in their learning. Attwell's (2007) research in blogging supported this conclusion by stating that learners have taking more control in their own learning by producing more content.

Thirdly, the blog enabled students to participate equally in a learning community, where all shared equally. Students are freer to post information and become a community of learners. Finally, Ferdig and Trammel's (2004) study concluded that blogging allowed for opportunities for students to share unique viewpoints freely, as opposed possible inhibition in face-to-face discussions. Dickey (2004) also agreed with this by stating that blogs can permit learners who have been disregarded in the classroom by their peers, to express themselves more freely. Learners are no longer isolated or frustrated because with the use of blogs, they are now able to post their thoughts online with blogs.

*g) Theoretical framework*

The theoretical framework for this study is of the study is based on Novak's (2002) meaningful learning and Ausbel's (1960) theories. Novak (2011) referred to meaningful learning as "where the learner seeks to integrate new knowledge with relevant existing knowledge" (p.1). If students solely rely on learning by rote memorization, there is no meaningful integration of new ideas and therefore cognitive structures within the mind are reconstructed. In essence, learning does not take place by rote learning (Novak 2002). Novak (2002) referred to meaningful learning occurring on "…a continuum, depending on the quantity and quality of relevant knowledge possessed by the learner and the degree of her/his effort to integrate new knowledge with existing relevant knowledge" (Novak 2002, p. 552).

Novak's (2011) work which is based upon Schwab's theories (1973), suggests that meaningful learning includes five basic elements. These elements are:"…teacher, learner, subject matter, context, and evaluation, each of which must be integrated constructively to effect high levels of meaningful learning" (p.1).

The first element, the teacher, is one that was based upon the teacher as the deliverer of instruction, thus requiring the recipients, the students, to memorize the information given. Teachers previously has been



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responsible for arranging the instruction and assessment while guiding their students to learn by rote. This model has endured centuries and is still in place throughout schools. Much of what educators call learning is rote and is often called "situated cognition", which is defined as what is observed by the learner often is not transferred to another context (Brown, Collins, & Duguid, 1989). Brown, Collins, and Duguid (1989) found that when students imitate solving math equations by following the steps, they were unable to apply them afterwards in similar situations. Typically, teachers in K-12 and in higher education have been the deliverer of knowledge. This one-way transmission of knowledge is typically assessed by essay or multiple choices quizzes and provides very little assessment other than immediate recall (Novak, 2002). This model has persisted across the decades and is still very prevalent in our educational institutions. According to Novak (2011) the teacher's instructional role should be that of a coach for learning rather than a distributor of information.

The second element is the learner. In this element although the teacher can provide many meaningful experiences, but ultimately the learner must take primary responsibility in their own learning (Novak, 2011). Meaningfully learning is "…accompanied by some degree of affective experience and this affective connotation colors to some extent the meaning of or concepts (Novak 2011, p.5). The learning must make sense of the new information by taking prior knowledge and integrating into personal meaning. With rote learning there is often very little emotional dedication other than the recalling of the learning. On the other hand, significant learning occurs when the learner chooses to incorporate new knowledge with prior knowledge. Learning now makes sense to the learner, with a positive affect (Ausubel, 1960). Ausbel's (1960) theories explore how the learner processes large amounts of meaningful material from verbal and textual formats in classroom settings. Ausubel (1960) views knowledge as being part of an interworking organization. Ideas must be joined together in a logical manner, since the human mind follows rules of logic. According to Ausubel (1960), the mind is like set of boxes, in which smaller boxes or the ideas, fit neatly within a sets of larger boxes. "Cognitive structure is hierarchically organized in terms of highly inclusive concepts under which are subsumed less inclusive sub concepts and informational data" (Ausubel, 1960. p. 267). Aususbel's (1960) learning theories hold that subsumption allow for learners to understand new knowledge and incorporate it into our cognitive structures. Thus, authentic learning is facilitated by the scaffolding of information and placing it in proper "boxes" for retention and future use. "Subsumption," Ausubel (1962) informs us, "may be described as facilitation of both learning and retention" (p.217). "If this ideational scaffolding is clear, stable, and well organized," Ausubel and Fitzgerald (1962) assert, "it is reasonable to suppose that it provides better anchorage for new learning and retention than if it is unclear, unstable, and poorly organized" (p. 244).

Subject matter, the third element refers to not just a large body of facts and details in a field of study, but rather a structure of "big ideas". What often occurs in today's schools involves an endless pouring of information to be memorized with little regard to students creating meaningful learning experiences around big ideas (Novak, 2011). Big ideas should be sequenced around sound instruction. Ausubel (1960) felt that once these super ordinate concepts were understood, then meaningful learning around big ideas took place. "Brain studies by Valadares and Moriera (2009). also lend support to the fundamental idea in Ausubel's (1960) theory that knowledge stored during meaningful learning is fundamentally organized differently than knowledge learned by rote, and affective associations are also different" (Novak 2011, p.3)

The fourth element revolves around context. The context refers to the conditions surrounding learning. For example, increased global competition is driving the United States economy. In this sense, it is the context of this competition that is forcing educators to rethink the how, what, when and the whys of teaching and learning. "For the last century, education has been the principal driver for upward mobility of individuals and countries and this is even more likely to be the case in the future (Novak, 2011, p. 7).

The last element, evaluation is according to Novak (2011), the most essential, since it is designed to gauge growth in the student's understanding of the subject matter. Typically, assessments have traditionally not measured gains in growth. Instead they have simply measured recall of facts. Change in the ways assessments is handled is not an easy undertaking nor does it require any more financial expenditures; however, it is possible with rethinking what truly matters, such as the big ideas.

These elements followed the thinking of Ausubel and Robinson (1969) when they stated that "…material presented to the learner should be capable of being related in some sensible fashion" (p. 46).

New information must be fitted into a larger pattern or whole. Second, the learner must possess relevant ideas to which the new idea can be related or anchored. The learner must already have appropriate subsuming concepts in his or her cognitive structure. Finally, the learner must actually attempt to relate, in some sensible way, the new ideas to those which he presently possesses. If any of these conditions are missing, the end result will be rote learning. (p.46)

*h) Purpose of the Study*

The purpose of this study was to observe how effectively the Jigsaw cooperative learning method

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would be viewed as an instructional delivery model as opposed to the traditional lecture and student presentation model in a graduate Educational Leadership class.

*i) Statement of the Problem*

Students whether they are in Kindergarten or graduate school often learn by rote. Memorizing facts and figures seems to have been and be the norm in many institutions throughout society. "Rotely learned materials are discrete and isolated entities which have not been related to established concepts in the learner's cognitive structure" (Ausubel, 1963, p.215). Consequently, concepts that are simply memorized are easily forgotten because they have not been neatly stored in the portions of the brain that can retrieve them (Ausubel, 1963). Learning which is retained and applied to a context is meaningful. In order to apply the knowledge students, need to be able to have meaningful experiences instead of rote memorization."Meaning occurs when learners actively interpret their experiences using certain internal, cognitive operations" (Driscoll, 2005, p.115). Furthermore, according to Ausubel (1963), textual materials presented in our classes, should be meaningful.

The researcher came across this problem in a graduate Educational Leadership course that he was teaching on the administration of special populations. In this course, each student was assigned a special program, such as Migrant Education and proceeded to conduct research on areas which public school administrators needed to become knowledgeable. The research noted that once the student presented in class, classmates were either absent for other student's presentations, not attentive or were just passively listening to the other presentations, without any engagement. Hence no meaningfully learning beyond the student's own presentation took place. The researcher wanted to change this and created a system utilizing the jigsaw cooperative learning method as outlined in the review of the literature. The research problem is that much of learning taking place in this graduate school course is often memorized with larger chunks of material being processed. In addition, learning is not social and is often done in isolation and uncooperatively.

*j) Research Questions*

1. What were the elements of the jigsaw method that were reported by the graduate students enrolled in the course as being successful ?
2. Why were these elements of the jigsaw method that were reported by the students as being unsuccessful?

## III. Methodology

*a) Setting and Participants*

The participants of this study were thirteen students in Educational leadership graduate students enrolled in an Administration of Special Populations course. Twelve of the thirteen students were females. The majority of the participants had been half way through their program in Educational leadership. Student's ages ranged between 20 to 50 years old.

None of the students prior to the course had experienced using the jigsaw method either in an undergraduate or graduate course.

*b) Qualitative approach*

The central methodology of this study is based upon the principles of qualitative research. Qualitative research is a methodology that is used in aiding researchers to further understand or to explain the meaning of a social phenomenon "…with as little disruption of the natural setting as possible" (Merriam, 2009, p.5). Reality is constructed by the participants themselves and it is the aim of qualitative research to create understandings of the experiences of the participants. What is of upmost importance is to document and construct meanings from the participant's views and not of the researchers (Merriam, 2009). Since it is the goal of the researcher to understand a participant's views, selection of the participants is typically nonrandom and purposeful and in the case of this study.

*c) Case Study Research*

This study further employs that use of a case study, which according to Yin (2003) is one of several manners in conducting social science research. Yin (2003) states, that a case study research is the preferred method when "how or why questions are being posed" (p.1). This study utilized the case study approach since; case studies typically are used to contribute to the body of knowledge of and individual or group (Yin, 2003). The case study should be "…intensive, holistic description and analysis of a single unit or bounded system" (Merriam, 2009, p.13).

In addition, the case study examines a "phenomenon within a real-life context, especially when the boundaries between phenomenon and context are not clearly evident" (Yin, 2003, p13).

This case study was *particularistic*, in nature since it focused upon one particular event, which in the case of this study was a project in a semester long graduate course (Merriam, 2009). According the Merriam (2009), the specific case is important because of what it may reveal about the phenomena being studied. "The specificity of focus makes it an especially good design for practical problems-for questions, situations, or puzzling occurrences arising from everyday practice" (Merriam, 2009, p.29).



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In developing research questions for case studies, Yin (1994) suggests that "how" and "why" questions have distinctive benefit. Furthermore, case studies should be used in exploring the process, which should "describe the context and population of the study" and discover "the extent to which the treatment or program has been implemented" (Merriam, 2009, p.33). In the case of this study, the research is striving to understand the effect up student's perceptions about the jigsaw method of learning using cooperative groups.

*d) The Jigsaw process*

In this study, the lead research had taught an educational leadership graduate level course that covered the Administration of Special Instructional Programs, which typically covers special instructional programs such as Bilingual, Migrant, Special and Gifted and Talented education. The lead research had taught this course for three semesters and had assigned each student research and presentation project for only one of the special populations outlined in the syllabus. Although this research and presentation was one of serval assignment, it served as the main content of the course. The lead researcher had noticed a disturbing pattern during each semester of either student being absents or inattentive during major presentations. Consequently, the lead researcher felt that in order for students to become actively engaged in the major presentations, he decided to change the instructional delivery for both the online and face-to-face classes. After conducting some research on interactive and collaborative learning, the instructor decided to create a jigsaw activity for each of the special instructional programs. Each instructional program was broken down into distinct jigsaw pieces (categories), such as the following: a broad over view of your topic, Key traits of the special populations, legal aspects of the special population, admission, monitoring exiting, an organizational chart of a district, "What are Key things that a campus administrator needs to know about the Special Population?", "What every teacher needs to know", Key assessments (Federal Funding Sources, State/Local Funding Sources, and a word from an advocate. Each week, a matrix of jigsaw pieces was created by for each special population which assigned each student the category assigned for that special population. A team leader for each special population was selected along with their assigned presentation date. The team leader was responsible for compiling all the jigsaw pieces, the categories, and creating a presentation, that was presented by them. In the event that someone did not post anything, for their category, the team leader made an effort to contact that person and the professor. If nothing has been done by that person, they would receive a zero for their jigsaw piece or category and the team leader is responsible for posting the missing information for that category.

## IV. Data Collection and Analysis

*a) Online Questionnaire and Interview*

According Merriam (2009), "…the case study does not claim any particular methods of data collection or data analysis. Any and all methods of gathering data, from testing to interviewing, can be used in a case study" (p.28).

As parts of the instrumentation for this case study, graduate students enrolled in the course, were administered a forty-one item questionnaire based upon a four point Likert scale, which had the following response choices: Strongly Agree, Agree, Disagree and Strongly Disagree. The questionnaire in this study employed questions which were purposely similar in nature so as to elicit similar responses and establish reliability.

The other data source for this study consisted of an interview session, which according to Yin (2003) assists the researcher in directly focusing upon the case study topic. The interview in this study consisted of twelve questions which were designed to elicit open ended responses. Interview questions are guided conversations rather than ridged questions that allow the participants to openly remark from their experiences and express their thoughts about events (Yin, 2003). This allows for the process to become free flowing rather than inflexible (Rubin & Rubin, 1995). The main purpose of the interview is to acquire specific information. The researcher is striving to find out what the participants feel or think about a specific phenomenon In other words, researchers interview participants to obtain information that cannot be directly observed, such as feelings and perceptions (Patton, 1990).

## V. Results

Analysis of the questionnaire data and the face to interviews revealed the following themes: students had a positive experience with the jigsaw due to it being collaborative, learning was facilitated by being divided into smaller chunks of information, access using the classroom blog was easy, and students considered themselves as subject (topic) area experts.

Conversely, data analysis revealed that students felt that the following areas were drawbacks to the jigsaw project: there was missing information from the blogs, a lack of quality/accuracy, repeated information and a lack of feedback from their peers.

*a) Positive experiences with the jigsaw*

One hundred percent of the students either strongly agreed or agreed that they enjoyed the jigsaw class project. Students during the interview overwhelmingly stated that really enjoyed it and wanted to utilize this teaching method in their respective classrooms. Students revealed that many of them felt that such experiences should be included in their other graduate level courses, whether they were beginning or



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advanced levels due to the collaborative nature of the jigsaw, they did not feel overwhelmed by the course.

*Table 1 :* Students' enjoyed the jigsaw (n=13)

| Number | Question | SA | A | D | SD |
|---|---|---|---|---|---|
| Q3 | I enjoyed the jigsaw project and I wish that I had more projects like this in other courses. | 38% | 62% | 0% | 0% |
| Q4 | The jigsaw project was a good project for me since it allowed me to focus upon only 1 aspect of a special population. | 69% | 31% | 0% | 0% |
| Q8 | I liked putting the pieces together. | 31% | 69% | 0% | 0% |
| Q9 | I was motivated to work on my piece of the jigsaw because it was not overwhelming. | 62% | 38% | 0% | 0% |

*sa: strongly agree; a: agree; d: disagree; sd: strongly disagree*

*b) Collaboration*

Both the questionnaire and face-to-face interview revealed that student's overwhelming reported enjoying the collaborative nature of the jigsaw. Many commented that they enjoyed the manner in which was constructed and expressed an appreciation of working in teams, as opposed to conducting their research assignments alone. They felt that their voice was heard in class because each of them were able to contribute to the body of knowledge constructed by themselves and their classmates.

All the students reflected that working in teams was a good experience for them. One indicated that it was "fantastic way for students to work together in gaining knowledge on a specific topic" .Another student stated that they believed it beneficial when everyone worked as a team because they were able to share information about that special population and did not "stress out over a big project on their own".Being provided with information from other students on the various topics has allowed them to see things from various perspectives and making it easier to understand key components.

Another student felt that they enjoyed that jigsaw project as well because it was an excellent technique to train others for professional positions, in which team members each contributed important pieces to a specific task. They stated that, "…this (sic) is a great experience to learn how to work with people with different personalities and different specialties pretty much."Thus the jigsaw project was enjoyed by the students due to its collaborative effort while eliminating the ideas of working in isolation.

In addition, students stated that they felt more accountable, since their classmate srelied upon their "puzzle pieces" for that topic. One student commented that they, "like being responsible for one piece of the jigsaw". They further stated that working this manner facilitated the comradery among classmates outside of the classroom. Working on the jigsaw created a social network similar to Facebook and encouraged classmates to ask their peers for help concerning classwork or other matters.

*Table 2:* Students' work best as a team (n=13)

| Number | Question | SA | A | D | SD |
|---|---|---|---|---|---|
| Q11 | I felt my voice counted in class. | 54% | 46% | 0% | 0% |
| Q12 | I felt like I was part of a team.. | 62% | 38% | 0% | 0% |
| Q14 | I listened more during the presentations because I was responsible for a piece of the puzzle.. | 62% | 31% | 8% | 0% |
| Q18 | I work best when I am working with others. | 46% | 31% | 23% | 0% |
| Q33 | I felt that my learning was dependent on my classmate's contributions. | 38% | 38% | 23% | 0% |
| Q34 | I felt accountable to my classmates for posting the best information possible. | 54% | 46% | 0% | 0% |
| Q37 | I did not feel peer pressure and was comfortable while sharing my work with my classmates. | 38% | 46% | 15% | 0% |
| Q38 | Working a group project put less pressure on my learning about the special population. | 46% | 38% | 15% | 0% |
| Q40 | I did not have any conflicts with my classmates while working on the jigsaw piece. | 69% | 31% | 0% | 0% |
| Q24 | I think I would have learned more about a special population had I done the project alone. | 0% | 15% | 62% | 23% |

*SA: strongly agree; A: agree; D: disagree; SD: strongly disagree*

*c) Ease of access*

Although the class was one hundred face-to-face, the instructor in this study utilized the use of Blackboard as a vehicle to manage the class. Students collaborated through the use of Blogs and constructed weekly course content. They majority of the students in



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the study acknowledged that online technology made it easier to research and post materials. They reflected that the Blog was an excellent medium for posting and accessing the content. At the end of the week each student was able read each other's postings and share them for class discussions for the next class meeting.

*Table 3* Blogs are a positive experience Students (n=13)

| Number | Detail | SA | A | D | SD |
|---|---|---|---|---|---|
| Q27 | The Blog allowed for me to post my puzzle piece easily. | 69% | 31% | 0% | 0% |
| Q28 | The Blog allowed for me to view my classmate's postings. | 77% | 23% | 0% | 0% |
| Q29 | Blogs are an effective tool for peer learning. | 69% | 31% | 0% | 0% |
| Q30 | The use of blogs improves my understanding of the special population.. | 46% | 54% | 0% | 0% |
| Q32 | I would recommend this method to other professors because the use of blogs improves my academic performance. | 69% | 15% | 15% | 0% |
| Q39 | I can easily download the jigsaw pieces or the completed project on Black Board. | 62% | 38% | 0% | 0% |

*SA: strongly agree; A: agree; D: disagree; SD: strongly disagree*

*d) Smaller Chunks*

One hundred percent of the students reported that they enjoyed learning and learned best about a topic when they researched smaller parts of the whole. Students expressed contentment for working with smaller chunks of information because they felt that learning was easier, more focused, and less over whelming Students felt learning easier when having to research and read postings with smaller pieces of information at a time. Smaller chunks of information about a topic did not seem like to burden to learn. Some students reflected that the jigsaw "…allows for certain areas of the topics to be broken down into smaller segments that make it easier to understand". One student stated that learning about a special population such as migrant education seemed more enjoyable due to fact that jigsaw was divided up that they could go back online and read or reread the blog prior to taking a quiz over the subject matter.

Learning with smaller chunks was also reported as being more focused. Students expressed that a broad amount of information was often difficult to take in. One student stated that, "If this assignment would have been assigned to me all at once, (sic) like the whole program, I don't think that I would have been able to complete it in one week. It is way too much information for one person to do alone. Furthermore, I really enjoy working on the Jigsaw every week and I feel that I get more out of the assignment like this." Another student exclaimed that when it came time to study for a quiz, they were able to understand the whole project because it took away stress from researching the whole topic.

In addition to being easier and more focused, learning in smaller chunks was reported as being less overwhelming by students. The data indicated that, students expressed concern about being overwhelmed throughout their graduate studies because of the amount of class work, family and work obligations. However, when questioned about working on the jigsaw pieces, students felt less overwhelmed due to "…working on smaller portions of the project in a group made the work load less verses working on it alone (sic)."Several students agreed and further stated that, "…working on one aspect of a project rather than the whole made learning less stressful."

Another student stated that, "…the vast amount of information for each topic is overwhelming, having to work on just one key aspect for each topic allows learner to focus and have a better understanding."

*Table 4:* Students learned with smaller chunks of information (n=13)

| Question | Detail | SA | A | D | SD |
|---|---|---|---|---|---|
| Q10 | I learned better about a special population by researching a small piece of all special populations as opposed to researching only one special population. | 54% | 46% | 0% | 0% |
| Q22 | I learn best when I work on small pieces of information at a time. | 46% | 54% | 0% | 0% |
| Q31 | I was motivated to participate since the jigsaw was only a small piece of the puzzle. | 85% | 15% | 0% | 0% |
| Q35 | Learning complex concepts is easier when it comes in small portions | 69% | 31% | 0% | 0% |
| Q36 | I retained the information on the special population more since I was responsible for a small portion. | 54% | 46% | 0% | 0% |

*SA: strongly agree; A: agree; D: disagree; SD: strongly disagree*



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*e) Subject area experts*

Upon compellation of their weekly jigsaw piece, students stated that they had felt like subject area experts. They felt their learning was deeper when they could focus on one weekly specific topic and took delight when they could contribute to the class content and discussions. They were able to report to the class and instructor in a well-informed manner and felt a sense of pride and ownership in their collaboration. One student revealed that they had done a similar exercise in their undergraduate studies and that they valued being a subject area expert. Furthermore, they enjoyed collaborating with their classmates and expressed a strong sense of collaboration and ownership over their researched contributions. Students explained during the interview that, learning does not always or should not always come from the instructor. In fact, when students taken on their own learning, they have a strong emotional attachment and feel a sense of ownership and accomplishment.

*f) Areas that were drawbacks to the jigsaw project*

The data also reported by the students in the questionnaire and interview also disclosed un successful elements. In answering Research Question Two, the following themes emerged: missing information, a lack of quality/ inaccuracy in the information, repeated information, and a lack of peer evaluation.

*g) Missing information*

After the weekly class presentations and discussions students noticed on occasion, some of the content posted was missing key information. The instructor followed up by filling in the missing gaps to the weekly jigsaw postings, but this occurred to late according to most of the students. During the week, while students were researching, posting and reviewing the blog jigsaw pieces and preparing for a weekly quiz, some students complained that there were too many blanks. One student explained that "…the thing that I dislike from the jigsaw project for this class is that I have found some students to leave their assigned part blank and I am not able to know if the part that they were assigned is not applicable for the program we are discussing that week or if they are just late to turn in their assigned part." Another student agreed and exclaimed, "…although the blog is great for obtaining information, it only functions correctly if all members are submitting their part. Blank sections by my peer's postings left me to have to gather the information myself and save it. This required that I invest more time."

*h) Lack of Quality and Inaccuracy*

Another drawback to the jigsaw was an occasional lack of quality in some of the individual postings. Students reflected how disappointing it was to post and review some of the postings only to find out that some of the information was poor and inaccurate. One student stated that, "…at times, additional time is being spent on researching items that should have been answered by students but were not thorough in their explanation." Most students stated that it seemed like a waste of valuable time having to verify the accuracy of the postings. A students, explained, that, "…instead of just focusing on our assigned part, we also have to verify that the information they have provided is correct or if the information they have not provided is because it does not exist in the program". Students reflected that they even began questioning their own blog postings. One stated, "As I complete my blog, I tended to doubt myself and I wondered if I have understood the information the correct way and if I am providing my classmates with the most essential and useful information of the assigned topic". All students agreed that the was a major flaw in the project, since it was time consuming, confusing and potentially harmful since this information could help them during an interview or their future career as an administrator. Furthermore, because of this, some students felt a lot of pressure on themselves because they to ensure to others that that information posting was correct, due to the fact that their classmates were counting on them to be accurate"

*i) Repeated Information*

Students reported that they also felt that another drawback to the blog postings was that occasionally there was repetition in the weekly postings. One student stated that, "…although I do not have very many negative things to say because I actually quite enjoy the blog jigsaw project, the only thing that I do dislike is the fact that at times some of the information although based upon different topics of the assignment at times tend to repeat the same thing." They further explained that they felt that it was due to the fact that when a person does research they have the tendency to categorize what they are writing very much like we do in the blog, but they also do not monitor what they are inputting into the research. Another reason for repetition would be due to while researching, some students were unsure of good resources to find current material for their jigsaw pieces. Consequently students would view their peer's blog postings and look up their references. Many expressed that by doing so, it was much easier than researching library databases or google scholar.

*j) Lack of Feedback*

One last item that students reported concerned peer evaluation. Although, they responded and like very well the instructor's feedback about their jigsaw postings, they expressed the need for peer approval and criticism. Over six-two of the student's responded that wanted to evaluate their peer's jigsaw puzzle pieces. One student stated that they, "would like to ask questions and discuss responses with my peers" They felt that this type of interaction would help others better



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understand the material in the blogs. Most agreed that any type of peer feedback should also be similar to the rubric based instructor feedback, since it would provide an "…opportunity to go back and check flagged answers that we have concerns with". Lastly the explained that this allow allows for more social interaction and communication that the blogs begin to utilize.

*Table 5:* Students Evaluation of student jigsaw (n=13)

| Question | Detail | SA | A | D | SD |
|---|---|---|---|---|---|
| Q41 | I wo uld like to evaluate my classmate's jigsaw puzzle pieces | 8% | 62% | 31% | 0% |

*SA: strongly agree; A: agree; D: disagree; SD: strongly disagree*

## VI. Discussion/Conclusions

This study suggests that, if designed properly, the jigsaw is an effective teaching strategy which allows adult students to learn through socially collaboratively interaction and as opposed in isolation and rote learning. In this study, the teacher's role had changed to a non-traditional one. Learning as reported by the students had more meaning because the instructor was no longer the primary source of learning, instead learning was no longer a one way transmission of information from the instructor to the student. Students took on an active role and created the materials by researching and posting on the blog them selves. As Novak explained (2011) the instructor should take on new roles such that of an instructional coach rather than the dispenser of knowledge. The graduate students in this study preferred non-traditional methods over traditional lectures.

Because, the element of the teacher changed and was moved to a different role, students took more of a responsibility in their own learning. Students were able to become invested in their work by taking pride or having a sense of ownership in their learning. Learning in this study also became more student centered and interactive with the use of blog. When actively involved in the learning process, the graduate students felt that more effectively learned when they are actively involved in the process. Knowles (1980) agreed with this when he wrote that, "…there exists "a spirit of mutuality between teachers and students as joint inquirers" (1980, p. 47). "Since adults manage other aspects of their lives, they are capable of leading, or at least assisting in planning, their own learning" (Knowles, 1980, p. 47).Additionally, the graduate students in this study reported they were more attentive when they were actively involved in the process of the jigsaw method.

The study also suggests that it is also an effective technique for teaching broad concepts or "Big Ideas" such as the concepts of the Special Populations discussed in this study's graduate class. The graduate students in this course reported that they learned effectively when information was gathered and reviewed in smaller "chunks". Student perceptions reflect that learning large amounts of information was easier to work with as a cooperative group as opposed to individually. As Ausubel (1960) stated, ideas should be joined in a manner that makes sense so that the mind will create order. This follows Ausubel's (1960) subsumption theory, since working in the jigsaw, allowed ideas to be hierarchically organized. Instead of memorizing large blocks of information, big ideas were be sequenced around sound instruction.

Lastly, students used web based technology as an effective vehicle for learning through the use of the blogs. Blogs permitted the students in this study to communicate freely asynchronously and seamlessly across distances. Learning was not inhibited by face-to-face classroom dialogues in which sometimes does not allow all students to contribute. Instead the blog allowed all students opportunism to share unique viewpoints with the possible inhibition in face-to-face discussions. This closely aligns to Novak's (2011) ideas of context, since it allows for other ways of staying connected with each other without any boundaries of space or time.

### *a) Limitations and Recommendations*

The study was conducted during one semester out of thirty-six-hour program. The study's population size was limited to thirteen participants. Of the thirteen participants, twelve students were female. None of the student had any prior experience with the jigsaw method as a student or teacher. Further research should be done replicating the conditions of the study. In addition, online and face-to-face instructors, should take into account the success and drawbacks when designing their learning activities and environments. Whether face-to-face or online, instructors of adult students should continue to make learning more interactive, cooperative and a social experience. In addition instructors should break down lessons into smaller manageable chunks of information that is actively monitored for inaccuracies, duplications or omissions and critiqued by both the instructor and students. With all this in mind, learning can become more enjoyable and meaningful for adult students.

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