ISSN No:-2456-2165

FGA discussion on the Mixed Methods Research Approach to Studying the Relationship between School Leadership and Students use of Technology

Dr. David R. Brecht

Abstract:- The article positions mixed-method research (MMR) as a principled research method to the traditional quantitative and qualitative research approaches for studying the relationship between school leadership and student use of technology. By discussing MMR in an analysis of some of the common research paradigms, the article presents it as a scientifically evaluated choice to address the complex needs of contemporary researchers on this topic. It submits MMR as a method with breadth and depth of sufficient quality and quantity to assist researchers in choosing this methodology for research into this relationship. By explaining fundamental principles and major theoretical tenets of a mixed-methods approach, involving both quantitative and qualitative data collection, and triangulation of data in reply to research questions, it spells out several advantages of implementing MMR methodology. There is rich literature around this research design endeavoring to provide researchers an understanding of the richness and applicability of this approach. Backdropped against some notable works in the field, this article provides an overview of mixed methods designs, discusses its main uses, the concept of school leadership and explains challenges one can potentially encounter when in using the MMR with a view to assisting researchers in their addressing of this relationship.

Keywords:- *Leadership, Mixed Methods Research, Student Technology Use, Quantitative, Qualitative.*

I. INTRODUCTION

The aim of research is to solve a problem or add to an existing body of knowledge on a subject, such as; is there a relationship between school leadership and student use of technology. A research paradigm, therefore, is a philosophical position about the world or the nature of reality and how we approach it to understand it (Maxwell, 2005). The addressing of a problem or the contribution of new knowledge, may involve the use of a quantitative, qualitative or a mix method approach to research. Does it add up, or can the words create a clearer picture in the mind's eye, or does the picture help the numbers make sense or conversely do the numbers support the descriptions of the phenomenon? These questions frame the separate approaches, or when amalgamated, the mixed method approach to research. The basic assumption is that the use of both quantitative and qualitative methods, in combination, provides a better understanding of the research problem and questions than either method by itself. It is a "legitimate inquiry approach" (Brewer & Hunter, 1989).

The mixed method approach has been more of an evolution than a revolution of thinking. This paper describes the development of the mixed methodology in educational research. The mixed method approach involves some quantitative and some qualitative research. Mixed-methods research (MMR) is a research methodology that incorporates multiple methods to address research questions in an appropriate and principled manner (Bryman, 2012; Creswell, 2015; Creswell & Plano Clark, 2011), which involves collecting, analysing, interpreting and reporting both qualitative and quantitative data. A further discussion will evaluate and justify the appropriateness of a mixed methodology research design for a study regarding the relationship between school leadership and student use of technology by identifying what is meant by student use of technology and what factors of leadership could be investigated.

II. QUANTITATIVE AND QUALITATIVE APPROACHES

Quantitative research today looks very much like it did in the late 19th century. However, research gathering numerical data has been in practice since the time of Plato. The researcher poses questions gathers data, and conducts the analysis using statistical software to obtain quantifiable information, which can be quantifiable and generalized from a sample to the population. Creswell (2008) found, historically trends have led to characteristics of quantitative research that we see today:

- An emphasis on collecting and analyzing information in the form of numbers
- An emphasis on collecting scores that measure distinct attributes of individuals and organizations
- An emphasis on the procedures of comparing groups or relating factors about individuals or groups in experiments, correlational studies, and surveys.

This form of research claims the researcher is able to keep their bias, beliefs, perception and values from influencing the research. However, the bias, beliefs, perceptions, and values of the researcher are assisting in identifying the problem and conducting research.

Creswell (2008) found the ideas for qualitative research developed in the late 1800s and early 1900s in fields other than education. However, the actual use of qualitative research in education is most apparent during the last 30 years of the 21st century. The development of the qualitative approach may have stemmed from philosopher's postulations that quantitative research focuses too much on the researcher's outlook and not on the participant's outlook.

The removal of the researcher from the research process creates what advocates of qualitative research describe as a manufactured situation, almost a lab rat scenario.

Conducting research in schools, where relationships are ongoing requires more than the researchers' views. To obtain a fuller understanding of the people and their context, the study requires participant's views through a well-constructed qualitative approach. Qualitative methods are also supported as superior methods for understanding relationships in health services and policy research (Hurley, 1999). Qualitative researchers have recently taken significantly different approaches to research. Advocacy researchers are not objective, authoritative, or politically neutral. Advocacy researchers see qualitative research as a civic responsibility, a "moral dialogue" … and as a means for bringing needed change to our society (Denzin & Lincoln, 2005).

Whichever data is collected first, either quantitative or qualitative in the mixed methodology approach, usually determines the emphasis of the research. However, the combining of qualitative with quantitative, means, going deeper and adding new dimensions that mixed methodology advocates claim enrich the understanding more than what could be achieved through the generalization from a quantitative study.

Creswell (2008) found historical developments have led to characteristics of qualitative research that we recognize today:

- A recognition that as researchers we need to listen to the views of participants in our studies
- A recognition that we need to ask general, open questions and collect data in places where people live and work
- A recognition that research has a role in advocating for change and bettering the lives of individuals

Qualitative research advocates claim, the mixed method approach adds a deeper fuller understanding of the problem, ultimately leading to new knowledge contributed from the research. The development of the mixed method approach is important for a study regarding the relationships between school leadership and student use of technology, for the invaluable perceptions of leadership and students involved in the study.

III. DEVELOPMENT OF THE MIXED METHOD APPROACH

Since the 1930s, educational and social science investigators have combined research methods of data collection in their studies (Sieber, 1973). Campbell and Fiske did work in the 1950s on multi-method approach and that seemed to spark some interest in others to investigate mixed method research. Research by Sieber (1973) and Jick (1979) were early attempts at using a combination of surveys and narrative sources to create a richer, fuller picture, in their research on anxiety and job insecurity.

Some researchers raised the issue that a researcher who used certain methods also needed to use a specific worldview- the "compatibility" (Tashakkori & Teddlie, 1998) between worldviews and methods. This paradigm debate created a mind set until the late 1980s and early 1990s, and on into the 21st century. Arguments exist because certain proponents of the worldview paradigm believe the researchers worldview and method must belong together, yet the pragmatists would condone using whatever methods worked best to uncover new knowledge or solve a problem.

Since arguments still exist concerning the relationship between a researchers' worldview and research approach, advocates for deeper and better understanding that may support the mixed method approach as an opportunity to use the strengths of the two approaches. Commentary on the unity thesis (Creswell, Goodchild, & Turner, 1996; Walker & Evers, 1998), and the dialectical position by (Greene and Caracelli, 1997) add to the support for collecting quantitative and qualitative data. Arguments grow to support a move to mixed method approach where the participant's view is important.

Including the participants view during a study influences how one goes about conducting a mixed method. An explanatory mixed method would delve deeper into the relationship aspect as posed in the question. Sogunro (2002, p.7) documented that, "Research being a trust-finding construct aimed at verifying and authenticating phenomena, evidence abounds that the use of a combination of both quantitative and qualitative research methods results in a stronger validity of outcomes". As mixed method approaches grew, the need for designs that support the use of qualitative and quantitative data in the same study became evident. Designs that incorporated this belief, to be discussed include; triangulation, embedded design, explanatory design and the exploratory design.

The concept of triangulation was introduced as a mixed method approach. The concept was borrowed from the military, where several reference points are used to more accurately locate objects. The purpose of a triangulation (or concurrent or parallel) mixed nethods design is to simultaneously collect both quantitative and qualitative data, merge the data, and use the results to understand a research problem (Creswell, 2008). A large quantitative data set may provide support for qualitative data gathered from a small sample of interviewed participants. The qualitative data may provide deeper insight into the context of the study, supporting the quantitative data. In the triangulation method the mixed methods researcher often:

- gives equal opportunity to both quantitative and qualitative data
- collects both quantitative and qualitative data concurrently or simultaneously during the study
- compares the results from the quantitative and qualitative analysis to determine if the two databses yield similar or disimilar results (Creswell, 2008).

The embedded design uses quantitative and qualitative data simultaneously with one form supporting the other. In some designs the quantitative is gathered first, using the qualitative either before or after it has concluded. Conversely, the qualitative data may be gathered first with

ISSN No:-2456-2165

the quantiative data playing the supportive role. In this design the two data sets are gathered during the study, however, they may address different research questions. The two sets of data, quantiative usually addressing through statistics a comparison of groups or related scores. The qualitative process usually addresses experiences a phenomenon, and provides a deeper, richer picture of the context and problem (Creswell, 2008). In the embedded design method the mixed method researcher often:

- gives priority to the major form of data collection and secondary status to the supportive form of data collection
- collects both the quantitative and qualitative data simultaneously
- uses the secondary form of data to augment or provide additional sources of information not provided by the primary source of data (Creswell, 2008).

The explanatory design gathers data using a phase approach. This method uses two clearly distinguishable parts, an advantage for readers and researchers. The belief is that you collect quantitative and qualitative data separately in two phases so that data from one source could enhance, elaborate, or complement data from the other source (Greene, Caracelli, & Graham, 1989; Rossman & Wlson, 1985). This design is also called the "two-phase" model (Creswell & Plano Clark, 2007). This method usually dictates the collection of quantitative data gathering first with qualitative data used to expand, extend, enrich the picture of the problem. In the explanatory (two-phase) design method the mixed method researcher often:

- places a priority on quantitative data collection and data analysis
- collects quantitative data first in the sequence
- uses the qualitative data to refine the results from the quantitative data (Creswell, 2008).

The converse to the explanatory design where quantitative data is collected first, in the exploratory design, with the qualitative data collected first. An exploration of the phenomenon happens, then quantitative data is collected to help explain the relationships that may have been found. When instruments necessary to measure are not available and they and must be created in order to conduct the study, could indicate a possible use of the explanatory method. In the exploratory design method the mixed method researcher often:

- emphasize the qualitative data more than the quantitative data
- has a sequence to data collection that involves first collecting qualitative data followed by quantitative data
- plans on the quantitative data to build on or explain the initial qualitative findings (Creswell, 2008).

A melding of the two methods aided in the developed of the mixed method approach. Quantiative researchers started using narrative responses to validate the quantitative data. Some qualitative researchers started using quantitative data to see if the method supported the perceptions data collected. Mixed method approaches are relatively new, and are gaining recognition in the last 30 years. A review of the literature found that very few researchers have categorized their work as mixed method research and only after analyzing the research is one able to make that determination. The purpose of the study, the context of the study, the research questions and maybe the worldview of the researcher might all impact the selection of which mixed method design will provide a solution to the problem or add new knowledge.

The proposition that the Mixed-Method Research is a methodology all on its own, is gaining acceptance and propogation as a standalone methodology. A mixed-methods design offers a number of benefits to approaching complex research issues as it integrates philosophical frameworks of both post-positivism and interpretivism (Fetters, 2016) interweaving qualitative and quantitative data in such a way that research issues are meaningfully explained. Enosh, Tzafrir, & Stolovy (2014) said "the use of mixed-methods enables researchers to answer research questions with sufficient depth and breadth, and helps generalise findings and implications of the researched issues to the whole population".

The quantitative research supports data collection from large numbers of participants; thereby, expanding the feasiblity of applying the findings to a larger population. The qualitative approach, investigates a deeper understanding of an issue being reconnoitered, presenting the voices of its participants. Thusly, quantitative data brings a breadth to the study whilest qualitative data goes deep. Additionally, quantitative results can be triangulated with qualitative discoveries and vice versa. Triangulation, as a qualitative research strategy, is the use of multiple methods or data sources to develop a comprehensive understanding of a research problem or to test validity through the convergence of information from different sources (Carter et al., 2014). A mixed-methods design, therefore, offers the best chance of answering research questions by combining two sets of strengths while compensating at the same time for the weaknesses of each method (Johnson & Onwuegbuzie, 2004). Consequently, "mixed-method research designs are becoming increasingly relevant to addressing impact research questions" (Saville, 2012, p.7). The mixed method designs provide for the gathering of both quantitative and qualitative data, and procedures for analyzing both sets of data in the same study. The future of mixed method designs may be in studies addressing new phenomenon, such as students use of technology and the relationship to school leadership, with a greater emphasis on the student and teacher participants perceptions. A future study may involve a mixed method design to investigate parent's perceptions of the relationship between school leadership and student technology. If the data shows a relationship between all stakeholders (including parents) perceptions of school leadership, and student's use of technology, advocacy researchers may have a new problem to research. Advocacy researchers may research governmental programs for parent technology education. Even though mixed methodology research design, is in the infant stage, some pragmatists believe the methodology does address problems and does provide new knowledge. The identification of a study as using the mixed method approach, needs to be stated up front, thereby

expressing a belief by the scientific community that the mixed method design has research credibility. The student use of technology needs to be undertood in order to asses the appropriateness of the mixed method design for studying relationships between school leadership and student use of technology follows.

IV. STUDENT USE OF TECHNOLOGY

Oblinger, D and Oblinger, J. (2005) in the their book, Educating the Net Generation, provide a number of characteristics of the generation of students in high schools and colleges in the 21st century, these will be used as as points of discussion concerning student use of technology. People born before 1990 consider computers, calculators, cell phones, and MP3 players as technology. Net Generation learners (Net Geners), (people born between 1990 and 2003) consider technologies as simply activities they can get involved in that these pieces of technology enable. Therefore, we must adjust our thinking to address:

- what is student technology use for school(curriculum learning)
- what technological equipment are they using(that the school provides)
- what activities are they able to be involved in that use technological equipment (curriculum focussed)
- what life experiences are enabled by technological equipment that increase curriculum learning

von Glasersfeld (1995) argues that, "From the constructivist perspective, learning is not a stimulus-response phenomenon. It requires self-regulation and the building of conceptual structures through reflection and abstraction (p. 14)."The concept of reflection and abstraction are common concepts for Net Generation learners living and working in environments sprinkled with reality and virtual reality.Digital resources enable experiential learning—something in tune with Net Geners' preferences. Rather than being told, Net Geners would rather construct their own learning, assembling information, tools, and frameworks from a variety of sources (Oblinger & Oblinger, 2005). A synthesis of the research on student uses of technology in school produced a list of equipment and activities that Net Generation students (albeit to varying degrees) use.

These include:

- Computers to access the internet for information in the form of text, images, video or interactive simulation software
- PDAs to access the internet and store information in some media form
- Calculators connected to Smartboards or computers running data software
- Smartboards connected to LCD projectors, computers and interactive subject specific software
- Computers to produce graphic and video images as well as audio recordings(MP3s)
- Video conferencing technology for synchronous instructional delivery from point to point or multipoint
- Computers to access asynchronous delivery of online material

Oblinger & Oblinger (2005) describe Eric, a technology capable student. Eric would rise every morning to his computer screen filled with Instant Messages (IMs), calendar pop-ups, blog notices and reminders of quizzes or assignments due that day. Eric answers a few IMs, downloads that day's lecture materials from a class website, responds to a few blog postings and arranges meetings with classmates before leaving his dorm room. Multi-tasking during classes, Eric stays abreast of friend's activities while watching computer simulations. Eric returns to his room at the end of the day and works on a paper while playing an online game.

Students such as the fictional Eric, are able to access information about virtually anything, in real time, or from stored data asynchronously, thus living in the now world, accessing the asynchronous world with no delayed gratification. Students can, and do make snap decisions about what interests them. They decide whether the information is useful, harmful, exciting, boring or educational and respond accordingly. Students slip in and out of real and virtual worlds as easily as they do their non-laced shoes, and are comfortable doing so. In fact, these Net Generation learners get annoyed, if for any reason technology, or life slows them down.

Tapscott (1998) described Net Geners as assertive, self-reliant, curious people who are enmeshed in an interactive culture that centers around 10 board themes. These themes include:

- Fierce independence: Their sense of autonomy derives from their experiences of being an active information seeker and creator of information and knowledge.
- Emotional and intellectual openness: The N-Geners value the openness of the online environment, like anonymity, and communicate through numerous tools.
- Inclusion: They view the world in a global context and move toward greater inclusion of diversity.
- Free expression and strong views: With access to knowledge resources at their fingertips, the N-Geners are assertive and confident.
- Innovation: This group is constantly trying to push the technology to its next level and figure out how to create a better world.
- Preoccupation with maturity: Armed with knowledge, they strive to be more mature than their predecessors.
- Investigations: Curiosity, discovery, and exploration are key for this generation.
- Immediacy: This generation views the world as 24-7 and demands real time and fast processing.
- Sensitivity to corporate interest: Consumer savvy, these customers like customization and want to have options and to try before they buy.
- Authentication and trust: Net savy individuals know the need to verify and check resources and authenticate people.

This is not an atypical description of students of the Net Generatrion, therefore this reality might create concerns for educators. If teachers recognize that their students are able to multi-task, responding to many multimedia messages

and make quick decisions in nano-seconds, the way teaching happens needs to take these realities into consideration, if education is to be successful.

With knowledge of the Net Generation of students and how they use technology in some schools, the next question to be discussed concerns what is the relationship between school leadership and student technology use? The availability of technology for student use, in most schools, resides in the principal's decision making authority. The previously mentioned list of activities in which students use technology, informs us that in some schools the principal, through decision making authority supports provision of technology for student use. Therefore, what aspects of leadership need to be investigated to see if there is a relationship between student use of technology and school leadership? For the this discussion, school leadership will focus on the role of school principals, their style and associated behaviors, and the possible relationship to student technology use.

V. SCHOOL LEADERSHIP

Educational leadership theory research work, including those by (Klinker, 2006; Ireh & Bailey, 1992; Stramba, 2003; Kelley, Thorton, & Daugherty, 2005; Fritz, 2005; Colangelo, 2000; Vidic, 2007; Juenemann, 2007) include a discussion of Autocratic /Transactional, Democratic, Trasnformational, Laissez-Faire, Servant, Collaborative, Followership, Situational, Authentic, Passive/Avoidant and Thinking Out of the Box leadership styles. Drawing on the similarities from the aforementioned styles and components of leadership and including the culture component as suggested by (Deal & Peterson, 1999; Fullan, 2001; Fullan, 2003; Fullan, 2005; Fullan, 2006) an investigation of what behaviors school leaders do, that may impact the relationship between school leadership and student technology use, may unvail useful knowledge.

At root, school leadership is about connecting people morally to each other and to their work. The work of leadership involves developing shared purposes, beliefs, values, and conceptions themed to teaching and learning, community building, collegiality, character development and other school issues and concerns (Sergiovanni, 2007). Similar to the argument by (Reichwald, Siebert, & Moslein, 2005) that there is no concensual definition on leadership. The following list of behaviors is a synthesis of the research, offerred for consideration as leadership factors, to be discussed in relation to the impact they may have on students use of technology.

Leadership factors may include:

- Walk the talk: Demonstrating expectations through modelling technology use
- Interdependence and Independence: Providing Autonomy within a Censensual Operational Vision
- Supportive Culture: Confront the brutal facts and support individual and collective growth
- Build a band: Have virtuosos who make even better music together
- Sustainability: Build a moral purpose to be achieved through all we do
- Ensuring Everything is about Everybody Learning Every Day

Walking the talk is an observable behavior for students. When school leaders, principals, are able to demonstrate their technology skills in the student learning environment and assist students in their acquisition of such skills, students are able to see the link between leadership of the school and expectations for students. Staff being able to demonstrate technology use through their teaching and working with colleagues, model the interdependence that encourages students to help other students in the growth of technolgy skills. This walking the talk is then a symbol of the supportive culture within the school.

A single consensual vision is necessary. A vision that provides for and encourages independence and interdependence within the learning environment, supported by the principal leading learning initiatives. The vision needs to be observable by visitors to the school, through interactions with staff and students as they use technology. Everyone must be on the same team. As Collins (2001) says it, "get the right people on the bus", a team that provides for individualized or sometimes collaborative approaches to learning. This consensual vision supports the other leadership factors by providing a back drop within which actions can be clarified as supportive or not, shared or eliminated. Sometimes in schools, courses of action change as staff evaluate their actions. Reflecting on practice provides opportunities to challenege the direction of the bus, but support where the bus in going.

Confronting the brutal facts means being professional in practices, and doing so with the vision in mind. Staff and students are critical of the who, what, when, where, how and why they do what they do. Independence is respected and through the supportive culture ensures interdependence. The right questions are asked and professional growth is supported, with a vision that demonstrates everything is about everybody learning. (Senge, 2000) says, "every organization, whether it deliberately creates them or not," he continues, "is governed according to some explicit principles." These principles are "guiding ideas" – concepts that define what an organization stands for and what the members desire to create. These explicit rules also direct how professionals improve in their practice.

Supporting professional development for staff, as they move through mastery towards being a virtuoso in their area of work, demonstrates effective leadership. Equaly important is the modeling of life long learning so students understand the vision, Everything is About Everybody Learning; what it looks like, internalize it, and then make it part of what they do.

The moral purpose of educating everyone everyday questions practice and leadership event by event. Important questions reflecting on practice are asked to ensure practice aligns with visions, which aligns with the ability of interdependence and independence support structures to

advance growth through mastery to the virtuoso level. Ensuring everybody learns something everyday requires all to reflect on the other five leadership factors and make necessary changes. When people on a staff are working on the same functions, they may in fact be duplicating the same work; this is what (Spillane, 2006) calls parallel performance in a distributed leadership function. This often happens when the team ensures they work towards a single compelling vision. All stakeholders including students, staff and formal as well as informal leaders are working independently and interdependently with a strong vision, and supportive culture. The expectation of everyone reaching for virtuoso capability, will support students as they improve in their use of technology. With a clearer idea on what school leaders must do to support students use of technology, this paper will discuss why the mixed methodology research design may be appropriate for a study regarding the relationship between school leadership and student use of technology.

VI. APPROPRIATENESS OF THE MIXED METHOD

For this discussion, appropriateness will be operationally defined as meeting the purpose of the study, determining if there is a relationship between school leadership and student use of technology. The knowledge about the mixed method approach addressed in the first part of this paper will now be used to address what is known about how students in some school use technology, and what leadership factors may impact students use of technology.

For review, mixed method designs provide for the use of quantitative and qualitative data using specific designs: triangulation, embedded, exploratory and explanatory models. Therefore, in proposing the mixed method explanatory design researchers are asking for more information and richer detail about what leadership factors influence student use of technology including the students voice in the data. The researcher must decide which approach, quantitative or qualitative, will be the main focus. To get the richness of the perceptions, open ended interview questions could be constructed that could provide greater depth, more richness in description, possibly support the information aquired through the quantitative survey instrument.

Quantitative and qualitative data for this mixed method explanatory design could be gathered in using tools that already have established validity and reliability. The qunatitative survey instrument could ask students to identify which of the uses, previously identified in this paper, they use and how frequently. This could be done though a checklist with a likert type scale forced choice response, with each choice defined for clarity. The respondants could also fill in a similar instrument identifying the leadership factors previously presented in the leadership section of this paper. A correlational analysis could be run to determine if a relationship exists between the various student uses of technology and leadership factors. The use of these two data collection processes define the study as an explanatory study.

The explanatory design could be an appropriate methodology because of the approaches it incoporates in the data collection and analysis. This design has the advantage of clearly identified quantitative and qualitative parts, an advantage for readers as well as for those designing and conducting the study (Creswell, 2008). The explanatory design captures the best of both quantitative and qualitative design models through gathering of statistical data and participant's rich narratives. The quantitative results from a population in the first phase, and then the researcher refines or elaborate these findings through an in-depth qualitative exploration in the second phase. Qualitative research exploring leadership issues has evolved as a useful, more widely accepted and in some cases, more profound approach to insightful analysis and overall understanding (Conger, 1998).

A discussion of the appropriateness of mixed methodolgy for a study regarding the relationship between school leadership and student use of technology would not be complete unless the issues of validity, reliability and generalizabilty were presented. There has been very little argument concerning the ability of quantitative research and these terms, other than the contrivedness of the situation. This discussion has stemed from proponents of quantitative research, and reflective practice of qualitative researchers questioning the ideas. Therefore, rather than explicating how rigor was attained in qualitative inquiry, a number of leading qualitative researchers argued that reliability and validity were terms pertaining to the quantitative paradigm and were not pertinent to qualitative inquiry (Altheide & Johnson, 1998; Leininger, 1994). Some researchers looked for other criteria for assessing the validity, reliability and other credibility issues (Lincoln & Guba, 1985; Leininger, 1994; Rubin & Rubin, 1995). However, this argument could be considered mute in a mixed methodology explanatory design. The rigor in the quantitative side may satisfy those purists and the new criteria in the qualitative phase may meet the needs for a richer fuller picture.

A mixed-methods design can integrate and synergize multiple data sources which can assist to study complex problems (Poth & Munce, 2020). The relationship between school leadership and student technology use requires breadth, depth, triangulation, clean data, and sufficient syntex to provide color and clarity. This type of study epitimized the advanyages, five of them, that the MMR affords. Those are:

- The first rationale of employing an MMR approach is the expansion of study.
- both kinds of research have values and that in some respects they are complementary, and therefore, there will be an added value in combining them.
- An MMR approach helps "to overcome the epistemological differences between quantitative and qualitative paradigms and to provide a royal road to true knowledge" (Bergman, 2008, p. 4).
- An MMR approach helps to obtain more rigorous conclusions by employing two methods in such a way that the strengths of the qualitative methods offset the weaknesses of the quantitative methods and vice versa (Plano Clark & Ivankova, 2016).

- A researcher, for instance, aims to obtain a more valid picture about a research issue by directly comparing the findings drawn from one method (qualitative or quantitative) to those obtained from another (quantitative or qualitative) for convergence and/or divergence (Plano Clark & Ivankova, 2016).
- To develop more effective and refined conclusions by using the results from one method (qualitative or quantitative) to inform or shape the use of another method (qualitative or quantitative)" (Plano Clark & Ivankova, 2016, p. 86).

VII. CONCLUSION

The underlying rationale for mixed-method inquiry is to understand more fully, to generate deeper and broader insights, to develop important knowledge claims that respect a wider range of interests and perspectives (Greene & Caracelli, 1997). As presented, the amalgation of quantitative research and qualitative research through a mixed methodology could do what research is intended to do; solve a problem or add to the existing body of knowledge on a subject, such as; is there a relationship between school leadership and student use of technology? This need to contribute new knowledge occurs through the two-phased approach of the explanatory mixed method design as it provides for the best of quantitative and qualitative research to extend, deeper and enrich knowledge of the phenomenon of relationships between school leadership and student computer use. The reliability of the design to provide both quantitative and qualitative data substantiates the appropriateness of the design of the study. Data analysis states if there is sufficient evidence to support the belief that there is a relationship between school leadership and student computer use. Therefore, mixed methods design involves the collection analysis, and "mixing" of both quantitative and qualitative data to best understand a research problem (Creswell, 2008). For future research on the relationship between school leadership and students use of technology, the MMR could lead the way towards a greater understanding.

REFERENCES

[1.] Altheide, D., & Johnson, J. M. (1998). *Criteria for assessing interpretive validity in qualitative research.* In N. K. Denzin & Y. S. Lincoln (Eds.) *Collecting and interpreting qualitative materials.* Thousand Oaks, CA: Sage.

[2.] Brewer, J., & Hunter, A. (1989). *dlimethod research: A synthesis of styles.* Newbury Park, CA: Sage.

[3.] Bryman, A. (2012). Social research methods (4th ed.). Oxford university press.

[4.] Colangelo, A. J. (2000). *Followership: Leadership Style*s. Unpublished doctoral dissertation, University of Oklahoma,OK.

[5.] Collins, J. (2001). *Good to Great.* New York, NY: HarperCollins Publishers Inc.

[6.] Conger, J. A. (1998, Spring). Quualitative research as the cornerstone methodology for understanding leadership. *Leadership quarterly* .

[7.] Creswell, J. W. (2008). *Educational Research: Planning, Conducting, and Evaluating Quantitative and Qualitative Research (3rd ed.).* Upper Saddle river, New Jersey: Pearson Prentice Hall.

[8.] Creswell, J. W. (2015). A concise Introduction to Mixed Methods Research. Sage Publications Ltd.

[9.] Creswell, J. W., Goodchild, L. F., & Turner, P. (1996). *Integrated qualitative and quantitative research: Epistemology, history, and design.* In J. Smart (Ed.) (Vol. XI). New York: Agathon Press.

[10.] Creswell, J. W., & Plano Clark, V. L. (2007). *Designing and conducting mixed methods research.* Thousand Oaks, CA: Sage.

[11.] Creswell, J. W., & Plano Clark, V. L. (2011). Designing and Conducting Mixed Methods Research. Sage Publications.

[12.] Deal, T. E., & Peterson, K. D. (1999). *Shaping School Culture: The heart of leadership.* San Francisco, CA: Jossey-Bass.

[13.] Denzin, N. K., & Lincoln, Y. S. (2005). *The Sage handbook of qualitative research (3rd ed.).* Thousand Oaks, CA: Sage.

[14.] Fritz, H. L. (2005). *Transformational, Transactional, and Laissez-Fiare Leadership: An examinination of the Bass (1985) theory in the university classroom environment.* Unpublished doctoral dissertation, Capella University, MN.

[15.] Fullan, M. (2001). *Leading in a Culture of Change.* San Francisco, CA: Jossey-Bass.

[16.] Fullan, M. (2003). *The Moral Imperative of School Leadership.* Thousand Oaks, CA: Corwin Press.

[17.] Fullan, M. (2005). *Leadership & Sustainability.* Thousand Oaks, CA: Corwin Press.

[18.] Fullan, M. (2006). *Turnaround leadership.* thousand Oaks, CA: Jossey-Bass.

[19.] Greene, J. C., Caracelli, V. J., & Graham, W. F. (1989). Toward a conceptual framework for mixed-method evaluation designs. *Educational Evaluation and Policy Analysis, 11* (3), 255-274.

[20.] Greene, J. C., Caracelli, V. J., & Graham, W. F. (1989). Toward a conceptual framework for mixed-method evaluation designs. *Educational Evaluation and Policy Analysis, 11* (3), 255-274.

[21.] Hurley, R. E. (1999). Qualitative research and the profound grasp of the obvious. *Health services research, 34* (5), 1119-1136.

[22.] Ireh, M., & Bailey, J. (1992). A study of superintendents' change leadership styles using the situational leadership model. *American Secondary Education, 27* (4), 22-32.

[23.] Juenemann, J. H. (2007). *Thinking out of the box: leadership for effective public alternative schools.* Unpublished doctoral dissertation, Lewis & Clark College, OR.

[24.] Kelley, R. C., Thorton, B., & Daugherty, R. (2005). Relationships between measures of leadership and school climate. *Education, 126* (1), 17-25.

[25.] Klinker, J. (2006). Qualities of Democracy: Links to Democratic Leadership. *Journal of Thought, 41* (2), 51-63.

[26.] Leininger, M. (1994). *Evaluation criteria and critique of qualitative research studies.* In J.M. Morse (Ed.), *Critical Issues in Qualitative Research Methods.* Newbury Park, CA: Sage.
[27.] Lincoln, Y. S., & Guba, E. G. (1985). *Naturalistic inquiry*. Beverly Hills, CA: Sage.
[28.] Maxwell, J. A. (2005). Qualitative research design: An interpretive approach. Sage Publications.
[29.] Oblinger, D. G., & Oblinger, J. L. (2005). *Educating the Net Generation*. Boulder, CO: EDUCAUSE.
[30.] Poth, C., & Munce, S. E. P. (2020). Commentary—Preparing today's researchers for a yet unknown tomorrow: Promising practices for a synergistic and sustainable mentoring approach to mixed methods research learning. International Journal of Multiple Research Approaches, 12(1), 56-64. doi:10.29034/ijmra.v12n1commentary
[31.] Reichwald, R., Siebert, J., & Moslein, K. (2005). Leadership Excellence: Learning from an exploratory study of leadership systems in large multinationals. *Journal of European Industrial Training, 29* (2/3), 184-198.
[32.] Rossman, G. B., & Wilson, B. L. (1985). Number and words: Combining quantitative and qualitative methods in a single large-scale evaluation study. *Evaluation Review, 9* (5), 627-643.
[33.] Rubin, H. J., & Rubin, I. S. (1995). *Qualitative interviewing: The art of hearing data.* Thousand Oaks, CA: Sage.
[34.] Senge, P. (2000). *A Fifth Discipline: Schools that learn.* New York, NY: Doubleday.
[35.] Sergiovanni, T. J. (2007). *Rethinking Leadership: A Collection of Articles (2nd ed.).* Thousand Oaks, CA: Corwin Press.
[36.] Sieber, S. (1973). Integration of fieldwork and survey methods. *Imerican journal of Sociology (AJS), 73*, 1335-1359.
[37.] Sogunro, O. A. (2002). Selecting a quantitative or qualitative research methodology: An experience. *Educational research quarterly, 26* (1), 3-10.
[38.] Spillane, J. p. (2006). *Distributed Leadership.* San Francisco, CA: Jossey-Bass.
[39.] Stramba, L. (2003). Servant leadership practices. *The Community College Enterprise, 9* (2), 103-113.
[40.] Tapscott, D. (1998). *Growing up digital: The rise of the net generation.* New York: McGraw-Hill.
[41.] Tashakkori, A., & Teddlie, C. (1998). *Mixed methodology: Combining qualitative and quantitative approaches.* Thousand Oakes, Ca: Sage.
[42.] Vidic, Z. (2007). *Developing tomorrow's leaders: Examining Relationships Between Servant, Transfonnational, Transactional. Passive/Avoidant leadership and Emotional Intelligence, Motivation and leadership Opportunities.*Unpublished doctoral dissertation, University of Ohio, OH.
[43.] von Glasersfeld, E. (1995). *A constructivist approach to teaching.* In L. Steffe & J. Gale (Eds.). *(1995). Constructivism in education.* New Jersey: Lawrence Erlbaum Associates, Inc.