Research Article _____

Multi-Level Educational Leadership Model: Meeting the Needs of the 21st Century Classroom

Lisa Flanders-Dick, EdD
Professional in Residence and ELRI
Coordinator
Department of Curriculum, Instruction,
and Leadership
College of Education and Human Services
Louisiana Tech University
Ruston, LA

Dustin Hebert, PhD
Associate Dean of Accountability
College of Education
Sam Houston State University
Huntsville, TX

Joanne L. Hood, EdD
Assistant Professor
Department of Curriculum, Instruction,
and Leadership
College of Education and Human Services
Louisiana Tech University
Ruston, LA

Ric Shrubb, PhD
Associate Professor (retired)
Department of Curriculum, Instruction and
Leadership
College of Education and Human Services
Louisiana Tech University
Ruston, LA

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Abstract

Technology-enhanced teaching and learning (TETL) is the integration of technology into teaching and learning practices to improve the quality of learning outcomes. This is an essential strategy for improving educational quality. School leaders significantly affect the integration of effective TETL in classrooms, and the International Society for Technology in Education (ISTE) provides Standards for Leaders that serve as a framework for innovation in education. This study employed a qualitative, multi-level, multi-case study to investigate highly effective TETL public school districts in a southern state. Results of this study lead to the development of the Team Empowered Leadership Model, a multi-level leadership focused on encompassing the following key elements: vision, curriculum focus, student-centered, foster growth, empower future leaders, and support.

Key Words: technology-enhanced teaching and learning, TETL, multi-level leadership, school leadership model, leadership model, K-12, qualitative, educational leadership

Introduction

Technology-enhanced teaching and learning (TETL) is the integration of technology into teaching and learning practices to improve the quality of learning outcomes (Law et al., 2016). It is an essential strategy for improving educational quality, and school-level leadership directly affects TETL (Ghavifekr & Rosdy, 2015; Law et al., 2016). Despite research validating the benefit of TETL to aid and support student learning, integration of technology differs vastly between classrooms, schools, and districts (Ghavifekr & Rosdy, 2015).

Public schools and the public-school systems are complex, and a leader cannot apply a single leadership style to all situations while producing positive results (Blanchard et al., 1993; Hersey, 1985). School systems consist of multiple levels, including the classroom, school, district, and state. The decisions at one level affect other levels and the stakeholders within a system.

Attention must be paid to the school system's multi-level structure to avoid the risk of ignoring influence within its complex layers (Law et al., 2016; Liu et al., 2016). Due to school complexity, one leadership style cannot be applied to all leadership tasks (Hersey, 1985), including effective technology-enhanced teaching and learning in the classroom.

The problem studied in this investigation was school leadership characteristics that increase teachers' abilities to integrate technology into their classrooms effectively. This qualitative study investigated highly effective TETL public school districts in a southern state. The district and school leaders were interviewed to explore TETL, leadership, perception, skill, and self-efficacy to uncover

characteristics needed to promote and foster TETL.

Literature Review
Technology-enhanced teaching and learning

Technology-enhanced teaching and learning (TETL) is the integration of technology into teaching and learning practices to improve the quality of learning outcomes (Law et al., 2016). Effective TETL is an essential strategy for improving educational quality (Ghavifekr & Rosdy, 2015; Law et al., 2016; Trentin, 2012). TETL is more effective than a traditional classroom because it provides an active learning environment with more engaging and beneficial lessons for both students and teachers.

School leaders significantly affect the integration of effective TETL in the classroom (Chang, 2012). TETL is considerably beneficial for both teachers and students (Ghavifekr & Rosdy, 2015) and has been identified as an essential strategy for improving educational quality (Law et al., 2016).

TETL is significantly influenced by various factors including the educator's perception (Cope & Ward, 2002), skill, and self-efficacy (Ghavifekr & Rosdy, 2015). Educators' perception of technology is vital to successful TETL (Law et al., 2016). One of the most substantial barriers preventing effective TETL is the lack of educator's skills (Ertmer et al., 2012). Ghavifekr and Rosdy's (2015) study found that teachers are not given enough time to learn and be comfortable using technology in the classroom; this time could be provided by school-level leadership.

Teacher efficacy is directly linked to school leadership and culture (Ghavifekr & Rosdy, 2015). Therefore, school leaders are

crucial in the school system's multi-level infrastructure to promote and foster TETL (Kincaid & Feldner, 2002; Law et al., 2016).

International and National Focus on TETL

Various international and national agendas and standards promote the effective integration of FETL. The 2015 World Education Forum resulted in the adoption of the Incheon Declaration for Education 2030, which set a new vision internationally in education for the next 15 years. Education 2030 aims for inclusive and equitable lifelong learning for all, promotes children's and adults' urgent needs to build life skills aligned to our technology-driven world, and promotes lifelong learning and indicative strategies that include TETL (UNESCO, 2015).

The Education for All Act of 2016 in the United States promotes sustainable, quality basic education, which includes digital literacy and strategies built from effective practices and standards to achieve quality universal education (Education for All Act of 2016, 2016). The International Society for Technology in Education (ISTE) provides standards that serve as a framework for innovation in education. ISTE standards include standards for students, educators, leaders, and coaches (ISTE, 2018). The United States Common Core State Standards (CCSS) also include a focus on technology integration (National Governors Association Center for Best Practices & Council of Chief State School Officers, 2010). The Next Generation Science Standards (NGSS) include technology integration throughout the standards (NGSS Lead States, 2013).

According to the Technology Integration Matrix (TIM) framework, which was developed by the Florida Center for Instructional Technology (FCIT), there are five interdependent characteristics of meaningful learning environments: active, collaborative, constructive, authentic, and goal directed. Each characteristic has five levels of technology integration: entry, adoption, adaptation, infusion, and transformation. TIM is used to guide the evaluation of technology integration in the classroom that includes the following five characteristics: active, collaborative, constructive, and authentic (FCIT, 2019).

School-level leadership

School-level leadership improves teachers' effective TETL (Chang, 2012), and there is a need for research in this area (Ghavifekr & Rosdy, 2015; Law et al., 2016). Current TETL research predominantly focuses on the classroom level. Valuable insight is lost without focusing on school-level leaders' role in TETL (Chang, 2012; Law et al., 2016; Liu et al., 2016). School-level leadership must develop and implement a TETL vision and school plan (Chang, 2012; Ghavifekr & Rosdy, 2015; Law et al., 2016). The school plan should align with national, state, and district technology agendas (Raman et al., 2014).

The two greatest hindrances of TETL integration in the classroom found in Ghavifekr and Rosdy's (2015) research were top management and lack of time to learn. School leaders are crucial in the school system's multi-level infrastructure to promote and foster TETL (Kincaid & Feldner, 2002; Law et al., 2016). Future research needs to emphasize involvement and technology integration from leadership (Chang, 2012; Fisher & Waller, 2013; Raman et al., 2014).

Barriers to effective TETL

TETL provides numerous opportunities for effective teaching, but its effective integration

faces many barriers. Three factors that significantly influence TETL are the educator's perception (Cope & Ward, 2002), skill, and self-efficacy (Ghavifekr & Rosdy, 2015).

Educator perception of technology is vital to successful TETL (Cope & Ward, 2002; Law et al., 2016). Desired perceptions are educators perceiving TETL as part of student-led teaching and tools that encourage deep learning (Cope & Ward, 2002). Educators have the ability to shape how students perceive technology (Pittman & Gaines, 2015). Leaders' positive TETL perception have the ability to promote successful teacher integration in the classroom (Machado & Chung, 2015; Webb, 2011). Current research needs to broaden to include this factor (Cope & Ward, 2002; Law et al., 2016).

One of the most substantial barriers preventing effective TETL is the lack of educator's skills (Ertmer et al., 2012; Ghavifekr & Rosdy, 2015; Raman et al., 2014). Increases in educators' TETL skills improve teaching methods and promote learning infused with 21st-century skills (Ghavifekr & Rosdy, 2015). Almalki's (2020) research found a direct correlation between educators' TETL skills and technology integration, which was statistically significant.

School-level leaders' TETL skill growth of one unit could increase the teachers' technology use by .04 (Raman et al., 2014). Leaders who provide mentoring teachers with strong TETL skills promote higher levels of TETL on their campuses (Webb, 2011). Educators with high TETL skills have the self-efficacy needed to integrate the technology into the classroom (Hennessy et al., 2005).

Lack of educators' TETL self-efficacy is another barrier in its successful integration (El-Daou, 2016; Ghavifekr & Rosdy, 2015; Liu et al., 2016). Limited self-efficacy in TETL restricts its integration in the classroom (Liu et al., 2016).

A strong relationship (r=0.99) between educators' self-efficacy and TETL was found in El-Daou's 2016 study. Educators are not given enough time to learn and be comfortable using technology in the classroom; time that can be provided by school-level leadership (Ghavifekr & Rosdy, 2015)

Methods

This study used a qualitative, multiple-case design to adequately understand the complex nature of exploring school systems. The case study method facilitated the in-depth investigation of school leaders within their natural settings within a southern state.

Sample

Sampling was conducted in four stages to select, first, school districts that would each constitute a study case and, second, schools within the selected districts. First, three clusters of all potential school districts in the state were created based on district student enrollment and were used for embedded cluster sampling within the purposeful sampling to select the districts.

Each potential district was classified as 1) small (n $\leq$ 3,000), 2) medium (n = 3,001-9,999), or 3) large (n $\geq$ 10,000) based on student enrollment.

Second, board of directors' members of the state's leading educational technology association informed purposeful sampling of one district per cluster by ranking districts based on their knowledge of highly effective TETL in each district. Third, the top-ranked district in each cluster was selected as a study case.

Finally, each district's TETL leader, defined as the district-level employee who supervises all educational technology initiatives in the district, engaged in selecting schools in the district for highly effective TETL.

Of the board members, 75% participated in the study. District 1 was selected by 72.7% of the respondents as the large district. District 2 was selected by 100% of the respondents as the medium district, and District 3 was selected by 90% of the respondents as

the small district. Each district TETL leader provided three schools within the district recognized for highly effective TETL, and, when possible, the three schools represented the P-12 spectrum (see Table 1).

Each school leader from those schools was invited to participate, and the participant sample consisted of each district's TETL leader and three school leaders, one from each identified school, for a total of 12 participants.

Table 1

Participants by School District and School Site Grade Levels

	TETL Leader	School 1	School 2	School 3
District 1 (Large)	n/a	Grades PK-5	Grades 6-8	Grades 9-12
District 2 (Medium)	n/a	Grades K-8	Grades 3-5	Grades 6-8
District 3 (Small)	n/a	Grades 2-5	Grades 6-8	Grades 9-12

Data collection

Data were collected through multi-level interviews. The multi-level interview approach was selected due to the complexity of school systems in order to avoid the risk of ignoring influence within its complex layers (Law et al., 2016; Liu et al., 2016). Pseudonyms were used for districts, schools, and participants participating in the study to ensure confidentiality.

A structured interview approach was taken to increase the ability to compare responses between the various school districts (Merriam, 2009). Questions and the questioning sequence were developed, and questions included the six types of questions to help generate quality interview responses suggested by Patton (1990). Those six were:

experience/behavior, opinion/value, feeling, knowledge, sensory, and background/demographics.

As suggested by Patton, the sequencing of the questions began with more comfortable, straightforward questions that encourage descriptive responses to elicit greater detail. The questions were "open-ended, neutral, singular, and clear" (Patton, 1990, p. 295). The interview protocol consisted of 14 questions for district TETL leaders and 13 questions directly for school leaders. Each question was aligned with the constructs of TETL, leadership, perception, technology skills, and self-efficacy that drove the research. Interviews were conducted virtually and recorded with the permission of the participants and transcribed.

Data analysis

An analysis strategy of the constructs was followed to analyze the study's data (Yin, 2018). Constructs drove the objectives, design, and research questions of this study and thus have analytic properties. The constructs to analyze for this study were TETL, leadership, perception, skill, and self-efficacy. Each of these was analyzed per case (district). As suggested by Stake (1995), deductive manual coding was used to analyze the interview transcripts of each interview by case.

First, the data were read as an initial review. Next, the data were color-coded for keywords and phrases representing the predefined set of codes. Then, coded data were categorized and grouped to generate themes. After each case analysis was complete, a cross-case comparison was conducted to identify common themes across districts. All data analyses were evaluated for analytical generalizations on which the school leadership model was developed.

Trustworthiness

To ensure this study's trustworthiness, various strategies suggested by Merriam (2009) were employed for validity and reliability to minimize threats. To minimize threats of confirmability, multiple-level (district and school) were collected throughout the multiple-case study. Triangulation of data was achieved through the ability of findings to be confirmed through various sources of data (Merriam, 2009). To reduce threats of credibility, pattern matching was included in the data analysis procedures (Yin, 2018).
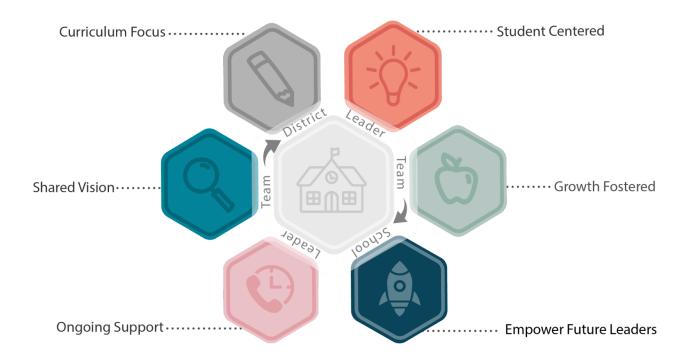
To minimize transferability threats, ethical considerations included explaining the purpose of the methods selected, case study protocol, confidentiality, and informed consent (Merriam, 2009). Finally, dependability was emphasized through clear communication with participants about the case study protocol to reduce the undependability of treatment implementation (Muijs, 2010). The same procedures and tools were utilized for both district and school-level interviews.

Team Empowered Leadership Model

A multi-level approach to TETL leadership which includes both a district and a school leadership team was created from the findings of this study. The district and school leadership teams need at least one person to create a direct link between the school and the district. This multi-level team approach is included in the Team Empowered Leadership Model (TELM) (see figure 1).

Figure 1

Team Empowered Leadership Model

Team

The multi-level team approach included the superintendent, district leaders, school leaders, and teachers. The TETL leadership team in each district began with the superintendent. Descriptions of the district superintendents in connection with TETL included promote the importance of technology, forward-thinking, and makes sure [technology] budget is well funded, within reason. The study district leader was identified as key to the success of promoting and fostering TETL in the schools. A common theme about the TETL district leaders was providing support through numerous professional development opportunities and assistance. Highlights of participants' perceptions of the study's TETL district leader included second to none and always at the forefront of what's out there.

Another shared layer of the leadership team is that at least one person directly connected the district and the schools. This position looked different in each district because some districts have multiple direct connections between the district and the schools.

The TELM multi-level focus encompasses the following key elements derived from the study's findings: vision, curriculum focus, student-centered, foster growth, empower future leaders, and support.

Vision

A shared vision developed by stakeholders and adopted district-wide is needed for effective TETL. Goals aligned with the vision should include using technology to enhance learning, meeting students' current and future needs, and connecting directly to the curriculum.

Leadership in each district, along with TETL team members, develop the TETL vision. Clear communication and buy-in are evident throughout each district. They speak the same language. In addition to the district vision, each school-level leader has additional TETL vision and goals specific to their school. An example of school-specific goals is the purposeful data collection and guidance by the administration at a district 1 school through *Snap Throughs* using the Bullseye program. Development and
promotion of a TETL vision align with ISTE Standards for Leaders 3.2 Visionary Planner: 3.2a and 3.2b (ISTE, 2018, para. 2).

Curriculum focus

Curriculum content is immersed throughout each element of effective TETL. Vision development should include the curriculum department. The district leadership team should also include someone from the curriculum department. Student-centered teaching strategies are to be modeled using curriculum content along with technology as a tool to enhance learning. Study participants agreed that technology should be used to enhance learning, not just used for technology's sake. Technology integration is directly connected to the curriculum.

The district TETL leader in all three districts also had direct communication and collaboration with the curriculum department for the district, as well as each of them is in charge of both educational technology and IT. An example of this is district 3 leader who has worked hard to blend curriculum and

technology in the district, supporting each other working toward one common goal in the district. A school leader in district 3 stated, "[DL3] is one of the big reasons we're so successful" promoting and fostering effective TETL. The ISTE Standards for Leaders (2018) which align with the curriculum focus mentioned include 3.2a and 3.2b.

Student-centered

Student-centered teaching strategies focusing on students being active participants in learning versus passive receivers of information are essential to effective TETL. Integration of student-centered strategies can be aided by incorporating a framework such as TIM to help communicate and model the vision of 21st-century learning. Providing the resources needed for effective TETL links directly to the ability to provide the student-centered strategies found throughout the districts.

Technology provides the opportunity to shift instruction from the traditional classroom with teacher-led lessons to student-centered lessons focused on the active learning environment, which integrates the 21st-century skills of collaboration, creativity, critical thinking, and communication (Berlinguer, 2012; Law et al., 2016). This building of life skills requires pedagogical sound teaching and learning methods supported by technology (UNESCO, 2015). Implementations of this study are the need for school leadership to understand TETL methods and strategies. Numerous student-centered strategies were documented by both district and school-level leaders.

Highlights of the student-centered strategies are aligned below with the TIM framework provided by FCIT (2019):

● Active examples from the study of students being actively engaged in using technology include a virtual scavenger hunt,

visiting space, jig sawing information, and providing and receiving feedback.

    ● Collaborative examples from the study of students using technology to collaborate include collaboration using NearPod, discussion boards, and team virtual activities.

    ● Authentic examples from the study of students using technology to link to the world beyond the instructional setting include VR, digital citizenship, and STEM.

    ● Goal Setting examples from the study of students having goal-setting experiences were students using Microsoft Teams or Seesaw to track their own data and set their goals.

    The ISTE Standards for Leaders (2018) which align with the student-centered strategies mentioned include 3.1a, 3.1b, 3.1c, 3.1d, and 3.3e.

Foster growth

Promoting and modeling growth in TETL is a crucial element of effective TETL leaders. Fostering of TETL growth includes a variety of professional learning opportunities and formats, avenues to share and collaborate with others, networking through social media, and involvement in professional organizations such as ISTE, TCEA, and LACUE. This also includes fostering personal growth of the leaders to stay connected.

    Professional development is a focus in all three districts. This focus along with the study sample being effective in TETL aligns with Campbell et al. (2015) findings of the positive impact of professional development supporting TETL. Professional development opportunities in each district and school varied including both face-to-face and virtual. Examples found throughout the study included Twitter Chats, traditional face-to-face with extended duration and support through Microsoft Teams, virtual trainings, and bit size

professional development opportunities distributed by newsletters. TETL professional development aligns with ISTE Standards 3.2e, 3.5b, and 3.5a for Leaders 3.2 Visionary Planner and 3.5 Connected Learner (ISTE, 2018, para. 2).

Empower future leaders

Leaders empower future leaders by building confidence through recognizing leadership characteristics and encouraging leadership roles such as leading professional development.

    Each district empowers teachers to become future leaders. Interviews included current leaders that were in their current position due to the TETL district leader's intentional encouragement and preparation from the time they were in the classroom. District 1 incorporates a building leadership model in the structure of their TETL team, visionary leader who works to empower others vision, and goals. District 2 leader is a by encouraging presentations, networking, and branding. Promotion and development of future leaders align with ISTE Standards 3.3a and 3.3b for Leaders 3.3 Empowering Leadership (ISTE, 2018, para. 3).

Support

Resources including equipment, software, and tools are one support element needed to promote and foster effective TETL. Additional supports include troubleshooting assistance, IT team, and methods and strategies coaching.

    This research found an abundance of equipment and tools in all three districts. For instance, the standard equipment in most classrooms in each district includes an interactive front of classroom display, one-to-one student devices, and a variety of software programs. Including an interactive display aligns with Yang et al. (2015) study, finding students regularly engaged through an IWB exhibited significantly better learning

effectiveness. The IWB group participants also had more positive attitudes towards their learning environment.

In addition to the provided classroom equipment and resources, each district had avenues for borrowing or ordering additional resources. Districts 1 and 2 provide a check-out system for equipment and tools, and district 3 shares equipment and tools between schools. District 1 awards points for professional development training in which teachers can purchase equipment and tools for their classrooms. School leaders in each district also shared the ability to communicate with the district TETL leader additional resource needs within their schools, which were typically able to be met. Providing resources directly connects with ISTE Standards for Leaders 3.1 Equity and Citizenship Advocate 3.1b and 3.4b (ISTE, 2018, para. 1 and 4).

The availability of equipment and tools also aligns with Education 2030 promoting the urgent need for children building life skills aligned to our technology- driven world (UNESCO, 2015). This finding connects also with the Education for All Act of 2016 in the United States by providing the needed resources to promote sustainable, quality basic education, which includes digital literacy (Education for All Act of 2016, 2016).

The additional supports found throughout the districts involved in the study included the IT department, help desk, on campus troubleshooting assistance as well as methods and strategies coaching.

Implications for Practice

Based on the results of this study, educational leaders should employ a team approach in their district and school leadership that encompasses the following key elements derived from the study's findings: vision, curriculum focus,

student-centered, foster growth, empower future leaders, and support.

While this research identified an effective school leadership model, there may be value in identifying characteristics of ineffective TETL. The Team Empowered Leadership Model developed through this study could be used to discover which elements are missing from an ineffective TETL district.

These insights would provide a list of what not to do in addition to discovering how missing parts of the leadership model affect a district's integration. Additional future research could include expanding the sample of this current study. The findings are generalizable but need consideration of independent school district structures that may differ from the current study sample.

Conclusion

Technology provides the opportunity to shift educational instruction from teacher-led to student-centered lessons focused on the active learning environment integrating 21st-century skills (Berlinguer, 2012; Law et al., 2016). An essential strategy for improving educational quality is effective TETL (Ghavifekr & Rosdy, 2015; Law et al., 2016; Trentin, 2012). Despite research validating the benefits of TETL to aid and support the student's learning, integration of technology differs vastly between classrooms, schools, and districts (Ghavifekr & Rosdy, 2015). School-level leadership improves teachers' effective TETL (Chang, 2012).

Current research reveals a significant need for additional research on school-level leadership in relation to effective TETL (Ghavifekr & Rosdy, 2015; Law et al., 2016). The complexity of a school system drives the need for a multi-level approach in research to avoid the risk

of ignoring influence within its complex layers (Law et al., 2016; Liu et al., 2016).

Educational leaders must understand their role to promote and foster effective TETL in classrooms throughout their district. TELM provides the foundation necessary to employ the needed team approach in district and school leadership which encompasses the following key elements derived from the study's findings: vision, curriculum focus, student-centered, foster growth, empower future leaders, and support.

Author Biographies

Lisa Flanders-Dick is the College of Education's Hub Coordinator at Louisiana Tech University. Her professional work includes K12 and HE teaching, consulting, and presenting in the academic disciplines of K-12 education, educational technology, STEM, and leadership. E-mail: ldick@latech.edu

Joanne Hood is assistant professor of educational leadership and program coordinator in the College of Education's Master of Educational Leadership program at Louisiana Tech University. She worked in K12 education for thirty years, seventeen as a school administrator. E-mail: jhood@latech.edu

Dustin Hebert is associate dean for accountability in the Sam Houston State University College of Education in Huntsville, TX. His professional work includes teaching, presenting, and publishing in his academic disciplines of business education, educational technology, and leadership. E-mail: dmh104@shsu.edu

Ric Shrubb recently retired as associate professor and coordinator at Louisiana Tech University's Doctor of Education program. His career has included service in K-12 and higher education as both a teacher and an administrator. E-mail: rshrubb@laech.edu

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