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A Mixed Methods Study of Leaders' Perceptions of Microlearning for Professional Development on the Job

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Abstract

This study investigated the use of mobile microlearning, supported with social learning strategies, and its perceived usefulness as a delivery mode for professional development on the job. The use of computer-mediated communication and microlearning have been explored in educational settings. This study expanded the context to managers and leaders in the aerospace industry (n=15) and healthcare professions (n=20). Data was collected using a self-developed, semi-structured interview protocol and Likert-style survey. A professional development training, using the Graphical Inventory of Ethical Leadership (GIEL) survey tool, was delivered to participants' mobile devices. Six themes emerged from the inductive analyses of the participants' responses including: the flexible delivery saves time, maintains leader's presence on the job, builds team cohesiveness, meets the leaders' needs for personalizing delivery of the PD/understanding their employees' learning needs, provides individuals with a voice in the selection of learning opportunities, and the absence of participants' stated concerns over the use of technology. Conclusions, models for understanding the concepts, and

implications for practice are provided.

Keywords: androgogy, computer-mediated communication, microlearning, micro-learning, mobile-learning, professional development, social learning, leadership development

1. Introduction

A new generation of workers with unique characteristics has begun to replace the baby boomer generation, now exiting the workplace. Could our use of professional development (PD) be failing to adapt to current best practices for these new leaders and their teams? According to a New York Times study, millennials "want flexible work schedules, more 'me time' on the job, and nearly nonstop feedback and career advice from managers." Though a variety of negative characteristics have been attributed to millennials, the generation coming-of-age during the technology and information-age explosion "may be simply adapting quickly to a world undergoing rapid technological change" (Main, 2017, para. 6; Lapidos, 2014; Singal, 2017).

It has been 15 years since the first online courses were delivered in higher education in the U.S (approximately between 1993 and 1995). Still traditional methods used in developing and distributing PD courses to business leaders have remained largely static (Buchem & Hamelmann, 2010). The computer-mediated models (CMC) implemented in the 20th Century created challenges for educators, who often lacked the technical expertise to transition to the new medium without extensive training, development, and support. Workplace training continues to be delivered in large course formats with burgeoning content—even though technologies provide multiple options for a variety of modes shown useful in the higher education context with adults (Garrison, Anderson, & Archer, 1999). Millennials are largely "digital natives," coming to the school and workplace often with more technical expertise than prior generations of technicians.

Microlearning (ML) differs from eLearning of the 20th Century, which attempted to replicate classroom instruction in an online format. As a form of computer-mediated communication (CMC), ML relies on a new web format, Web 2.0. The new users', millennials, "minds have been adapted to learning in a way that is suited to their attention span," using chunking of material into small bits, and is delivered on the individual's mobile device and social media applications to engage discussions online (Jaokar, 2007, p. 43). ML is an extension of the Web 2.0, an open source platform harnessing collective intelligence that "pushes out" content through RSS feeds and widgets and through location tags to mobile devices. The new "disruptive technologies" require our businesses, schools, and culture to create new behaviors and develop new teaching and learning practices to deal with them (p. 44).

CMC reduces costs of overhead while efficiently delivering content that was previously available only through face-to-face development opportunities (Rourke, Anderson, Garrison & Archer, 2001, p. 9). The versatility of CMC provides educational content "anytime anywhere" and offers an economic incentive for businesses to explore (Garrison et al., 1999, p. 87). ML has been shown to promote increased interaction between team members in the workplace, can be delivered independent of time and space, and, when properly developed, creates an engaging environment for a variety of adult learning applications. Because of the short and

focused nature of the ML modules, often integrating video delivery, ML is adaptable and easily incorporates the use of social learning into the process, with social media groups. Today the definition of classmate goes well beyond the walls of a face-to-face classroom or even the connectivity of a virtual classroom. Today's classmates are now partners in a leader's learning, and these partners extend to an array of people within our networks to include co-workers, friends, and social contacts (Stokely, 2015, para. 9).

1.1 Context of ML

Instructional delivery methods using ML have been tested in schools with teachers and students. This study explores the use of ML within a new context of adult leaders and their teams in business and the health services profession. When ML is delivered using androgogy, aka adult learning strategies, employees participate in collaborative learning with their managers, leaders, peers, work teams, and social networks, and are given choice over the learning tasks. Mobile delivery and learning strategies fit the specific needs of today's learning leaders. New strategies for digital learning are being developed. A few noted in the trade literature include, reducing content to gain more benefit, gaining upper management support for the change, learner-centered design, developing leaders' capacity to be their teams' teachers, creating learning partnerships, and designing accountability into the PD through measuring participants' subsequent change in behaviors to ensure focus and engagement (Mehta, Downs & Center for Creative, 2016).

1.2 Purpose

This study sought to develop a rich thick understanding of the perceptions of leaders related to their readiness and the potential for using ML as a delivery mode for PD on the job in collaboration with their peers, work teams, and social networks. Exploring the use of CMC modalities using ML and social learning strategies in the context of leadership in organizations is warranted in the face of rapid change, and due to the influence on the workplace from employee's changing personal preferences for types of learning modalities. Are the new generation of leaders and their reports a match for PD that uses an interactive mobile delivery method of ML and incorporates a social learning component similar to the social media platforms commonly used by today's Generation Y millennials?

1.3 Overarching Question

The overarching question was: How do leaders in the business and the health care professions perceive the use of ML, delivered through mobile devices and social learning strategies, for professional development on the job?

1.4 Definition of Terms

Following is a list of definitions of terms used in this paper.

Leader: A decision maker within an organization who has direct reports. This may be a manager or other position of formal authority.

Microlearning (ML): is a "catch phrase" for a variety of new technologies and web applications

used for learning using "digital microcontent." ML uses small learning units and short-term learning activities. People engage in ML when "seeking information to build new knowledge in networked digital media environments such as email, mobile phones, Google, and Web 2.0" (Jaokar, 2007, p. 44). The learning objects for this study were interactive videos, less than four minutes in length, with social learning activities attached to the end of the ML object.

2. Literature Review

2.1 Changing Employee Demographic - Millennials and Millearnnials

An estimated seventy-five million millennials (those born from 1981 to 1997) are overtaking the baby boomers (born 1946 to 1964) as the United States' largest living generation and must be reckoned with in the workplace (Quenqua, 2015, para. 1). But wait! A subcategory of Millennials has developed. Termed Millearnnials, this subgroup of Generation Y are sophisticated and discriminating consumers of technology. As the millennials and millearnnials become part of teams in the workplace and move into leadership positons, companies must make a rapid shift to quality CMC that provides access through mobile devices with applications that are We 2.0 driven, available anytime anywhere, and have just-in-time support (Stokely, 2015, para. 9). The way people learn, and expect to learn, has changed with the advent of social media. The expansion of the internet includes a multitude of shared resources and Web 2.0 tools.

2.2 Communities of Inquiry (COI)

With new technologies come new methods of communication and new modes of instruction. Communities of inquiry (COI) is a conceptual model developed by Garrison et al. (1999) as a framework to understand and allay challenges of educators confronted with the new computer-mediated communications (CMC). CMC was developed to take advantage of the versatility and cost effectiveness of online course delivery. In the 20th Century, computer conferencing facilitated distance education and shifted the bulk of educational transactions in this modality from face-to-face verbal to asynchronous written text. Asynchronous communication "is not immediately received or responded to by those involved (ex. emails and message board forums which allow people to communicate on different schedules)" (Kask, Wood, & Williams, 2018, para. 1). Forum postings provided online opportunities for students to exchange their responses to course curriculum prompts and to one another's responses. ML and social learning, through use of social media and "apps," are extensions of CMC using mobile devices instead of computers to take further advantage of convenience and ubiquitous access. As email becomes old-hat, text messaging, Snapchat, Twitter, and a variety of newer applications emerge and become mainstream and part of the ML environment.

"The core thesis [of COI] is…in an environment that is supportive intellectually and socially, and with the guidance of a knowledgeable instructor, [participants] will engage in meaningful discourse and develop personal and lasting understandings of [learning] topics" (Rourke & Kanuka, 2009, p. 21). The COI framework can be used to understand important elements in the development of ML modules. The COI model for CMC includes three primary elements considered necessary for educational transactions: teacher presence, cognitive presence, and

social presence.

Teacher presence includes two functions: 1) planning the educational experience - the selection, organization, and primary presentation of course content, and 2) the facilitation function, which may be shared with the students (Garrison et al., 1999, p. 90). Direct instruction can be thought of as part of the facilitation process or separately.

Cognitive presence refers to the extent to which participants of a learning environment are able to create shared meaning through sustained communication (Shea & Bidjerano, 2009).

Social presence is the degree to which learners are able to present their "real" selves to the other participants and develop relationships. Social presence supports the development of cognitive presence and may become an end it itself.

In a review of relevant articles on the topic of COI, Marton & Säljö (1976, as cited in Rourke & Kanuka, 2009) reported most studies focused on teaching and learning processes rather than empirically testing the effects of COI on educational outcomes. Self-report survey research found students' perceptions of their learning in COI correlated well with: their attitudes, level of social presence with student satisfaction, and lower levels of Bloom's taxonomy related to their cognitive performance. Rourke and Kanuka (2009) concluded that "it is unlikely that deep learning arises in COI" (p. 19). Meaningful learning that is accessible in a variety of new situations requires repeated practice over time resulting in a change in one's hierarchical structure with the new learning transferrable to new situations (Ausubel, 1963; Hanson, 2017; Novak, 2002). In this regard, managers and leaders should be reflective and deliberate about the type of learning and the learning goals they set for instruction using the ML modality.

2.3 Just-in-Time Support

A crucial part of any CMC process is the technical support provided to the deliverer and the participants. Key elements of just-in-time support identified in the literature included, instilling the basics, having information ready when participants need it, providing preloaded templates, using trained technicians to provide the technology support, not the trainer/leaders, and finding knowledgeable employees to teach others PD content that they have already developed (don't remake the wheel). The organization should make a long-term commitment to the modality, develop systems that support the entire team, not just a few, and build collegial relationships (Campus Technology, 2008). Figure 1 provides a model of COI, with elements of just-in-time support, identified from the literature.

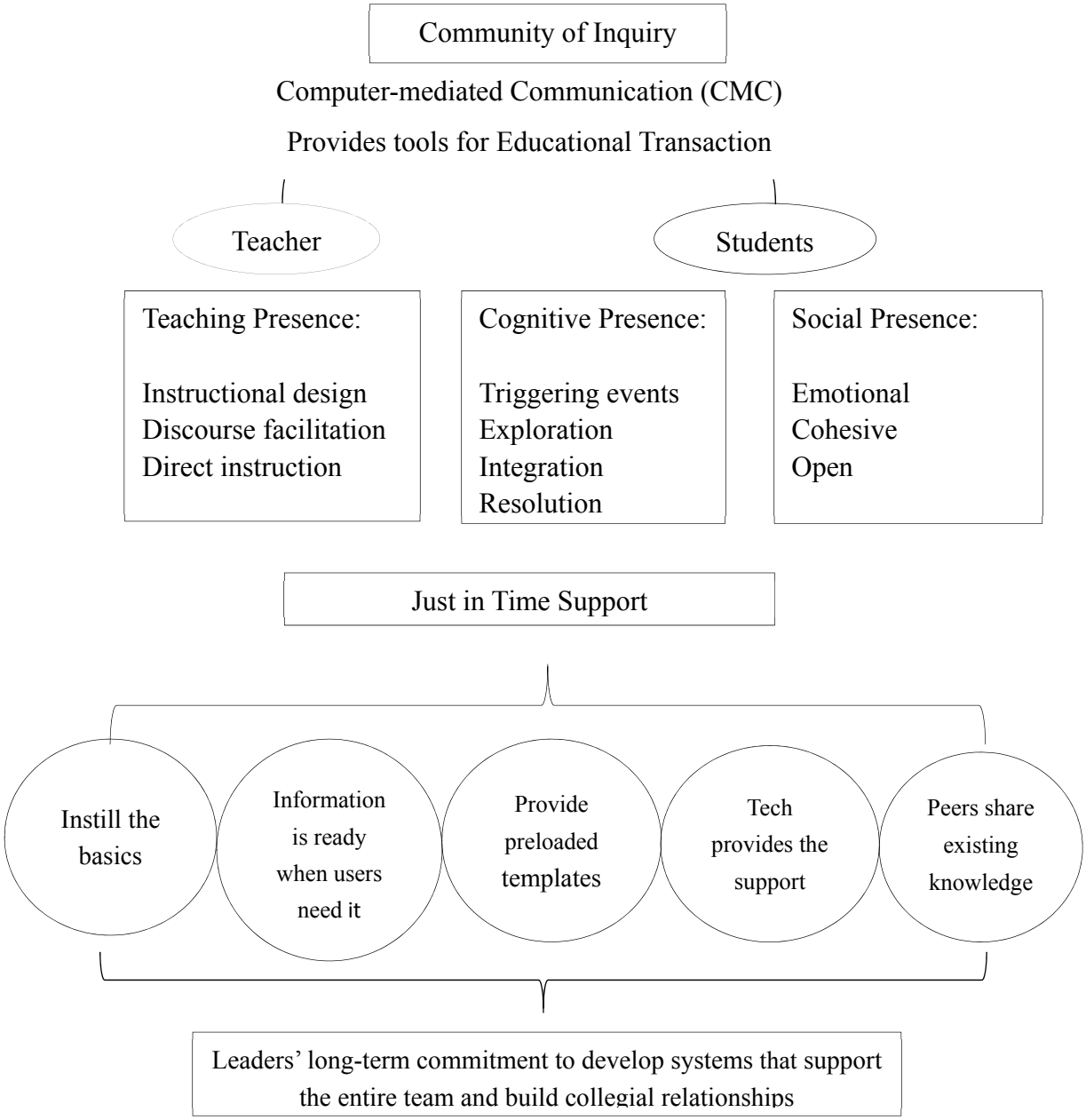

Figure 1. Framework for viewing elements supporting computer-mediated communication through the lens of community of inquiry model.

2.4 Benefits of Microlearning

Gassler, Hug, and Glahn (2004) found that one of the significant challenges in accessing learning today was the lack of availability for people to be removed from their work area to attend training. ML modules were first designed, from a mobile perspective, to facilitate access due to these identified constraints faced by leaders in today's faced-paced environments. Incorporating social learning with the technology of ML gives the participants the ability to interact with their peers at the time convenient to them, enhancing the learner's engagement to

create meaningful learning experiences for each participant. The acquisition of expert knowledge, through professional development on the job requires "a specific set of conditions which include participation with others in authentic, non-routine activities...that occur as a result of feedback from such use" (Leithwood, Jantzi, & Steinbach, 1999, p. 152).

The addition of technology to ML facilitates the use of multiple learning theories such as game theory, systems theory, andragogy (student centered), and heutagogy (learner directed) (Cochrane, 2007). A heutagogical approach, with the use of mobile technologies, meets the learners where they are and delivers the material in a way that is realistic and meant to create meaning through self-direction and the use of social learning. While the personal use of social media has surged, the use of social media for educational purposes remains low. It is probable that a combination of interactive ML and social learning strategies can facilitate improved practices in the workplace through the delivery of PD "pieces of training."

2.5 Design of ML

When the training curriculum using ML is designed for use on mobile devices, and built to be interactive, it is termed mobile learning and abbreviated, mlearning (Cochrane, 2014). The elements of portability, ease of use, and video resources in a mlearning environment are used to create interactive format-rich learning experiences. Fox (2016) found that ML in the workplace was effective because of this rich format capability. Highly focused learning materials, delivered in a variety of formats can accelerate PD, be highly personalized, and self-directed. A review of the literature on social identity theory and self-efficacy revealed that useful and well-received pieces of training must meet a variety of strategies including: delivered by individuals who have first built trusting relationships with the group, site specific, focused on the needs of the individuals, developed from pre-delivery research, delivered locally on a regular basis, affordable, support provided at the time the information is needed by the learner to improve performance, and include relevant and focused feedback on specific skills and tasks (Hanson, 2017). A well-prepared leader's use of ML on the job with his or her team will include all these features.

2.5.1 Microlearning Workflow

Leaders on the job must become the teacher who plans and designs the ML modules using pre-delivery research. The leader participates in and facilitates the learning of the participants. Begin by narrowly defining the objective (connect to prior knowledge). Develop a script, (needed if not using an existing video). Define the best tool for delivering the ML (that fits the organizational culture and individuals' needs). Create the ML content using adult learning strategies. Engage the participants in the PD using practical experiences and provide connections to the workplace (opportunities for learner-generated content). Create space for individual and team reflection. Share thoughts on the learning. Repeat.

ML for leader PD incorporates the design of androgogy and heutagogy. Andragogy is the art and science of adult learning and provides participants with opportunities for self-direction and social learning components. Heutagogy is self-determined learning based on the principles of andragogy (Knowles, 1984).

Further review of the literature included a description of a method of chunking delivery similar to ML but without using CMC. Called micro-cycle teaching experiments (MTE), this method for delivery of PD compared favorably to Hanson's (2017) elements of PD. The work flow for this process included: embed the PD in the daily planning and performance of the work, co-construct the PD with the leader to meet the learners at their place of need, and sustain the delivery of trainings over time (Billings & Kasmer, 2015, p. 165). Research results on MTE reported qualitative descriptions of changes in workplace behaviors that were incremental and built upon prior learning (p. 178). Two schema were developed for micro-cycles including: Schema 1 – prediction (reasoning about the new topic by connecting to participants' current knowledge prior to the lesson delivery), response (participants respond to prediction question and responses are used by instructor/leader to inform the direction of the lesson), reflection (prediction question repeated and participants reflect upon learning). Schema 2 – create problem-solving environment using three components: connect back (participants connect to prior learning), activity (actively solve a problem, explore an idea, or develop a new one), and summarize/reflect (share thinking and experiences during activity, reflect on what was learned) (pp. 167 & 168).

2.6 Effectiveness of Microlearning

The effects on the outcome of actual learning using ML are still being explored. Concerns raised over CMC include the transition to text-based versus face-to-face communication. One such concern is that CMC screens out much of the "nonverbal and paralinguistic communication" (Garrison et al., 1999, p. 90). The use of specific technologies such as interactive video, designed for mobile devices, along with synchronous sessions using video conferencing, can minimize the effects of these limitations.

Micro-teaching/video review of lessons was cited among the most effective strategies noted in a mega-analysis exploring the effectiveness of a variety of instructional strategies for teaching and learning. Micro-teaching with video review was reported to have an effect size of .88 (visible learning.^{Plus}, 2018, para. 3). Hattie (2012) explained that in order to consider an intervention or teaching/learning strategy to have a worthwhile effect the size of the effect must be greater than .40. (Note: A caveat has been raised by a statistician evaluating Hattie's methods. Hattie's effect size calculations may include miscalculations in meta-analyses and inappropriate baseline comparisons at the least (Bergeron & Rivard, 2017, p. 239).

Gassler et al. (2004) stated "One of the most important requirements for successful learning experiences is that the learning activity occurs on a regular basis" (p. 1). According to Billings and Kasmer (2015) using ML allows the participants to receive smaller "chunks" of learning and interact with the content over more extended periods of time. ML was shown effective in changing *specific types* of behaviors. An individual must engage in over 50 hours of training to create a consistent change in one's practices and behaviors. Behavioral changes occur through incremental and iterative processes of learning.

3. Methods

3.1 Study Design

This study explored leaders' readiness for, and their perceptions of the usefulness of, mobile technology-based forms of PD, called ML technology supported with social learning strategies that included their team in the process. The ML strategy used an interactive, highly-specialized, learning-video module that was less than three minutes in length.

The strategies used in this study addressed particular PD design elements. These included: increasing time on the job - the leader stays on the job while attending PD, using ML modules delivered through participants' mobile devices, use of online applications, and social learning strategies creating shared meaning - designed to engage the leaders' team in the development process of their leader.

The specific technologies used were interactive video designed for mobile devices. Flipgrid is a social learning platform using video media. A descriptive qualitative research design was used to explore the relationship between ML and leadership skills. The study design was reviewed and approved by the Institutional Review Board at a major university where the researchers are professors. Participants were instructed of their rights and the voluntary nature of the study. Consent was obtained through signing of a consent form. Consent forms and interview responses were kept separate to ensure confidentiality of the participants' identities.

Data was collected through an online survey and face-to-face and telephone interviews during the months of April through May of 2017. The interview protocols were coded to ensure the participants' identifying information was kept confidential. Data was kept separate from the participants' identities and stored on a password protected computer in a locked cabinet. All interviews were recorded and transcribed and any identifying information provided in the interviews was retracted after transcription. Copious notes were kept of the processes used and the findings were shared with the participants to ensure the themes and conclusions represented their intentions. The findings were triangulated with the literature to identify similarities and differences, to ensure conclusions drawn were supported in the framework provided, and to interpret the data collected.

3.2 Participants

The target population for this study was leaders in the business or medical services profession. The criteria for the selection of "leader" participants in this study included supervising at least one direct report who reports to them for accountability of task or job performance. The candidate must also hold a position where he or she makes decisions regarding scheduling, policy, or daily work activity that affect the direct reports. Participants were recruited from a convenience sample of leaders at one hospital service site (n=20) and one private contracting firm in the aerospace industry (n=15) in a large, mostly urban area, of a southwestern state in the United States. Prior knowledge and experience with technology was not assessed nor considered a criteria for participation.

3.3 Instruments

3.3.1 Qualitative Interview Protocol

A five-question, open-ended, semi-structured interview protocol was developed from a review of the literature and the researchers' professional experience. Various prompts were used to encourage the participants to expand on their responses, if necessary, to gather relevant interview data. The items are provided here.

1. Would you please share with me how you became affiliated with your organization?
2. Would you please share with me if you have participated in any professional development that utilized microlearning?
3. What do you see as the main benefit of microlearning using a mobile platform?
4. What would you consider to be a risk, or disadvantage, to using microlearning for professional development?
5. Would you consider participating in a microlearning experience for professional development?

3.3.2 Quantitative Survey

A 30-item online quantitative survey was delivered in two parts. The first part was the 25-item Graphic Inventory for Ethical Leaders (GIEL) designed to capture participants' ratings of the frequency of their ethical leadership behaviors as operationalized on the survey questionnaire. Items were in four categories: justice and equitable decision-Making (JED) Cronbach's alpha = .850, communication and modeling (CM) Cronbach's alpha = .717, personal and professional development (PPD) Cronbach's alpha = .816, and transformational leadership (TL) Cronbach's alpha was not provided for this subscale. The survey has face validity and construct validity being used in the educational leadership preparation program at a major university in the southwestern area of the United States (Hanson, Loose, Reveles, & Hanshaw, 2017). After submitting the responses to the online survey, participants received immediate feedback on their scores in the four categories. Participants could then choose areas for reflection and growth and set PD goals.

After participants had viewed the ML modules, they completed the second part of the survey. This section asked five questions designed to quantify the participants' perceptions of the usefulness of ML and social learning for PD on the job. All items were scored on a Likert-style scale of 1-5; five being the highest level of agreement. The survey questions are provided here:

Q1: When a manager or leader participates in the GIEL microlearning they are likely to change specific behaviors.

Q2: The ability to participate in professional development training/learning opportunities in small chunks is effective.

Q3: It is important for managers/leaders to be able to participate in effective professional development while maintaining their presence on the job.

Q4: The ability for a participant to select specific professional development areas and involve others in their learning through social learning activities is important for a leader's professional development.

Q5: The ability for a leader to involve others on their team in their professional development process through social learning activities will enhance team cohesiveness and communication.

Specific behaviors were purposely not defined within Q1. Researchers wanted to capture the participants' perspective on the strategy of ethical behavior they deemed as important. Participants could choose from an array of training items focusing on specific behaviors in the GIEL assessment.

3.4 Procedures

The survey and ML modules were designed from a mobile-first perspective. The participants were encouraged to use any mobile device to participate in the survey activity. Approximately 22% of the participants chose to use a mobile device. While these participants engaged in ML they were not asked to engage in the social learning component that occurred for the PD participants. ML modules were delivered via Flipgrid video and included an explanation and overview of the PD process used by the GIEL participants; including an explanation of the steps of the social learning process.

Before completing the survey, participants watched an 81-second explainer video on the ethical leadership measurement tool, the GIEL survey. The participants then completed the 25-question online survey and were presented with a 97-second ML video explaining the PD delivery strategy of ML. Then, the participants responded to five questions on the online survey: three questions asked for their perceptions of ML and two questions addressed the topic of team participation in PD. The questions were developed from a review of the relevant literature and the researchers' professional experience. The participants provided ratings of agreement to survey questions on a scale from (1) being the least to (5) being the greatest.

3.5 Data Analysis

Qualitative data was transcribed from the video recordings and the researchers redacted any names or identifying information the participants referred to during the interviews. Interview transcripts were coded to ensure confidentiality of the participants. The primary researcher performed a general reading of the transcripts to gain a feeling for the data. An inductive qualitative approach was used to create codes from the data based upon common phrases and meanings (Maxwell, 2010). From the codes, categories were developed and emergent themes identified. Descriptive statistics were calculated from the survey data including: mean of each survey item, standard deviation, CoefVar, and Q1. Tables 1 and 2 show the questions labeled Q1 – Q5 for ease of visualizing the data.

4. Findings

4.1 Emergent Themes

Six main themes emerged from the participants' responses to questions about their use of ML modules and social learning strategies: flexible onsite delivery saves time, maintains leader's presence on the job, builds team cohesiveness, meets the leaders' needs for personalizing delivery of the PD/understanding their employees' learning needs, provides individuals with a voice in the selection of learning opportunities, and the absence of concerns voiced by participants over the use of technology.

Theme 1. Flexible delivery saves time: The theme of the training coming to the participants and their ability to complete the training during a time that fit their schedule the best was constant throughout the data. One participant stated "It would give me more time to do the training. I could do it when I had time. The training would essentially make the time for me."

Theme 2. Leader is present on the job: Both the leaders and team members reported the importance of the leader being present on the job. An interview respondent stated, "One of the key benefits of ML, delivered on a mobile device, is that the leader can be present on the job and available to others." When a leader maintains a presence on the job site while engaging colleagues in social learning activities there is more opportunity for face-to-face dialogue due to the leader's engagement with their team in the learning process. More importantly, the leader is there to make or help with decisions while the learning process is taking place and improves the effectiveness of the organization. One participant stated "When I go to [away] to training for a few days I get the feeling that my staff thinks, "Oh no, what is she going to bring back for us to do?""

Themes 3. Develops team cohesiveness: The participants saw the social learning capability and aspect to be beneficial for team cohesiveness. When the leader is collaborating with his team and applying and practicing what they are learning directly in context, they are embedding skills in a way that a traditional classroom model cannot. One leader explained, "If I am able to engage with them in my learning and maintain a presence, I think they will be invested in the learning because they are part of the learning and any changes that happen."

Theme 4. Meets leaders' needs for personalizing delivery of PD and understanding employees' learning needs. The use of social media to engage colleagues and others in workplace learning provides an opportunity that was not easily available previously. As one participant leader reported, "This would work well because I am always looking for ways to engage my employees, and I can use this training to open conversations and learn from my employees' perspectives while creating the engagement I want."

Theme 5. Provides individuals with a voice in the selection of learning opportunities. Participants reported another aspect of the ML that was considered highly effective; that of being able to self-select learning opportunities and speak into the process. A participant shared that one of the strengths of ML was, "Allowing others to speak into a leader's professional development." Another quote from a participant also referenced concepts described in adult learning strategies, "Adults need to be involved in the planning and evaluation of their training."

Theme 6. The absence of concerns voiced by participants over the use of technology was considered a relevant finding of this study. Twenty-two percent of participants freely chose the use of a mobile technology device to complete the PD. All participants had technology familiarity and the necessary skills to engage the ML in the form delivered without additional training or support.

4.2 Survey Results

Thirty-five completed participant surveys provided data for the quantitative analyses. Table 1 provides the descriptive statistics for the item responses.

Table 1. Descriptive statistics of data gathered from quantitative survey.

Variable	N	N*	Mean	SE Mean	SD	CoefVar	Minimum	Q1	Median
Q1	35	0	4.06	0.10	0.59	14.57	3.00	4.00	4.00
Q2	35	0	4.57	0.09	0.50	10.98	4.00	4.00	5.00
Q3	35	0	4.63	0.08	0.49	10.59	4.00	4.00	5.00
Q4	35	0	4.57	0.10	0.61	13.30	3.00	4.00	5.00
Q5	35	0	4.54	0.10	0.61	13.45	3.00	4.00	5.00

The data was then analyzed using a t-test correlation between Q1 and the other items. Table 2 contains the results for the one sample t-test data.

Table 2. One sample t-test data

Sample	N	Mean	SD	SE Mean	95% CI for μ
Q1	35	4.06	0.59	0.10	(3.85, 4.26)
Q2	35	4.57	0.50	0.09	(4.40, 4.74)
Q3	35	4.63	0.49	0.08	(4.46, 4.80)
Q4	35	4.57	0.61	0.10	(4.36, 4.78)
Q5	35	4.54	0.61	0.10	(4.33, 4.75)

The data showed both a low standard deviation and low standard for error, indicating that the selected values were close to the mean or expected value. The 95% confidence rates were calculated and are provided in Table 2. The confidence intervals indicate the ranges the score would fall within and are also provided in Table 2.

Q1: This item's mean score of 4.06 was the lowest of all of the survey items (on a scale of 1-5 with five being the highest level of agreement). Participants rated their perception of the likelihood the leader's workplace skills would improve as a result of participating in the ML PD. A mean of less than 3.5 would show a level of uncertainty or disagreement with the question.

Q2: This item asked the participants directly whether they feel using small chunks of learning for PD is effective. The mean score of 4.57 indicated participants had a high level of perceived effectiveness for the use of chunked learning in the ML PD. This concept could be related to Theme 1 – saves time by providing small conveniently delivered content available when the participant needs it and to Theme 4 - allows for personalized delivery and recognizes individual's needs.

Q3: This item asked participants to rate the importance for leaders to be able to participate effectively in PD while maintaining their presence on the job. The response averaged 4.62, the highest mean value of all question items. This indicated a high level of belief that maintaining a presence on the job while participating in PD activities is important to leaders and their teams. This compared favorably with Theme 2 – Leader is present on the job. Participants indicated it was important to them to have their leader remain on the job to support them and be involved in daily work related issues.

Q4: The 4.57 mean score for Q4 was the second highest mean of the questions. Participants' valued being able to select specific PD areas and involve others in their learning, through social learning activities. Their involvement was also considered important for the leader's PD. These results compared favorably with Theme 5 - Provides individuals opportunities to participate in the selection of learning opportunities.

Q5: A mean score of 4.5 showed a strong agreement with the statement that it is important for leaders to engage in PD with their teams. This is of particular interest because it indicates leaders would welcome the opportunity to engage their teams in their PD. Where leaders' desire to engage employees in PD, combined with a low cost and the proliferation of web 2.0 tools to facilitate PD on site through ML, the likelihood of leaders developing and using this strategy with virtual teams or face-to-face teams seems high.

5. Discussion and Conclusion

5.1 Comparison with the Literature

The following chart compares and contrasts the results of this study with the literature on the topic. A brief summary follows.

	Theory or Model from the Literature			
Study Results	Millennials	Androgogy	Digital Learning	Targeted PD
Theme 1 – Flexible delivery saves time	Want flexible work schedules	Independent of time and space and efficiently delivers content	Reduces content for greater benefit	Provided on a regular basis
Theme 2 – Leader stays on the job during PD Survey (Supported by Survey Q2 & 4)			Collaborative learning with their supervisors	Delivered locally
Theme 3 – Builds team cohesiveness (Supported by Survey Q3)		ML increases interaction between team members	Creating learning partnerships	PD delivered by individuals who have first built trusting relationships with the group
Theme 4 – Allows for personalized delivery and recognition of individual needs of followers	Want nearly nonstop feedback and career advice from managers	Promotes individualized delivery	Learner-centered design; developing leaders' capacity to be their teams' teachers	Site specific; focused on the needs of the individual; relevant and focused feedback on specific skills and tasks
Theme 5 – Provides team members with a voice in leader's PD (Supported by Survey Q4)	More "me time" on the job	Provides choice to learner	Provide choice over the learning tasks	Based on pre-delivery research from learner's input
Theme 6 – Absence of stated concerns over the use of technology	Adapting quickly to a world undergoing rapid technological change			
Survey Question 1 - Lowest mean score indicating not as confident ML will change workplace behaviors		Rourke and Kanuka (2009) concluded that "it is unlikely that deep learning arises in COI" using CMC (p. 19).	Accountability in PD through measuring participants' subsequent change in behaviors to ensure focus and engagement	Support available at the time the information is needed by the learner to improve performance (face-to-face or synchronous access to knowledgeable mentor)
Not noted in study data		Low cost	Requires upper management commitment to the change	Affordable
References	(Main, 2017, para. 6)	(Rourke et al., 2001, p. 9)	(Mehta et al., 2016)	(Hanson, 2017)

Six themes emerged from the data in this study and were shown to compare favorably with concepts from the literature on the topics of millennials, adult learning theory, digital learning, and targeted PD. ML meets the needs of the emerging Generation Y millennial demographic in the workplace who have unique characteristics aligning with the design of small chunks of information delivered through ubiquitous mobile devices at the time they find convenient to them. The emerging Generation Y millennials have a subcategory of millearnnials that differ distinctly from the baby boomers, who were limited in their experience of and challenged by new technologies. Millearnnials, being "digital natives," prefer the use of ubiquitous and constantly updating Web 2.0 applications and social learning platforms.

Similarly, the use of ML objects delivered to participants' mobile device speaks directly to a major challenge of leaders. Leaders' can more easily fit ML PD learning time into their schedules and remain on the job where they are most needed (Gassler et al., 2004). However, responses to Question 1, scoring the lowest on the quantitative analyses mean scores, suggested participants were not as confident a leader's participation in a mobile-first ML PD training program would result in changes, or improvement, in the leader's skills and workplace behaviors. This is consistent with the literature suggesting that ML facilitates delivery of, and is indicated for, certain types of learning that can be chunked and that does not require deep changes in the participants' current understanding. The literature suggested ML can be supported with face to face weekly meetings with leaders and participants for feedback, asking questions, sharing tacit knowledge, and building relationships (Cochrane, 2014). These elements were also identified in targeted PD along with performing pre-delivery research to understand the unique needs of the individuals, site specific, delivered on a regular basis, including a knowledgeable mentor available on site when needed (Hanson, 2017).

There was a high perception among participants that involving others through social learning platforms would increase cohesiveness and communication within teams. This is consistent with the literature on social learning theory. Learning and thinking are situational and social activities (Bandura, 1977; Taylor & Hamdy, 2013). Adult learning theory aligned well with Themes 1, 3, and 4 that emerged from the data of this study including, flexible delivery, increased interaction between team members, individualized delivery, and personal choice of the learners over the content. Organizations must make long-term commitments to develop and sustain systems that support the use of efficient, on-the-job training and build collaborative teams, which are antecedents of organizational learning and intellectual capital (Seleim & Khalil, 2011).

5.2 Implications

Understanding the emerging characteristics of the new demographics of leaders and learners as well as the disruptive technologies dramatically influencing our socioeconomic environments, is necessary to meet the changing landscape influencing the upcoming generation of leaders' learning styles and needs. Adult learners benefit from strategies of androgogy and heutagogy for ML PD, as their needs and preferences are distinctly different from minor students in schools.

Developing effective ML includes: researching and understanding the employees' needs and

pre-existing knowledge on the training topic, creating small chunks of learning that activate prior knowledge, and providing opportunities to think about and apply new information with teams, peers, leaders, and others in their networks. Providing concrete experiences in the workplace is a next step, followed by time for reflection and discussion on what was learned with others. This is a reiterative reflexive cycle that requires long-term commitment on the part of the company. Repeated practice, supported by communities of practice (COP) that meet weekly to support learners' needs, will embed learning that can improve job place performance.

Employers must develop systems that support a combination of face-to-face opportunities for sharing and learning using CMC such as ML and social learning processes. An organizational-wide system is necessary to provide support to all members at the time the employee needs it on the job and that builds a collaborative workplace. ML using mobile learning (mlearning) also requires "pedagogical integration," which is the responsibility of the employer to develop the capacity of the leader. An alternative is to engage content experts in the area of PD development tools to ensure appropriate supports are available for successful engagement of ML and social learning strategies in the workplace. Another key element noted in the literature that is critical to the success of integrating mobile tools into the learning and teaching environment was "reconceptualizing" the learners' understanding of social media from a purely social modality to becoming a powerful learning tool for generating content and collaboration between team members (Cochrane, 2014). Readers are encouraged to make their own conceptual shift and engage in deep research in advance of providing ML PD. Leaders are encouraged to ensure the ML design incorporates knowledge of the intended learners' skills in media as well as their conceptions of its uses (Hanson, 2017).

The question of whether ML and digitally delivered social learning can affect desired improvements in job related behaviors is relevant and significant. The model of communities of practice (COP) "where people mutually guide each other through their understandings of the same problems in their area of mutual interest, and [in] this way indirectly share tacit knowledge" is indicated to support the delivery of ML and to promote meaningful learning (Pyrko, Dörfler & Eden, 2017, p. 389).

Organizations can support the development of their leader's capacities to become teacher/leaders in the use of ML including the use of adult learning strategies and COI; such as the elements of teacher, cognitive, and social presence (Garrison et al., 1999). In today's rapidly changing world, leaders' and employees must constantly be learning in the effort to keep pace with the demands of the job. Employers have limited budgets and employees have limited time.

5.3 Conclusion

The overarching question of this study was: How do leaders in the business and the health care professions perceive the use of ML, delivered through mobile devices and social learning strategies, for professional development on the job?

The conclusions from this study suggested leaders and their teams were ready and interested in

using ML for PD. The self-reports indicated ML with social learning strategies was a useful tool for developing team cohesiveness, met the need for teams to have their leaders present on the job, provided flexibility and convenience in access and deliver styles, embedded elements of androgogy and heutagogy including, promoting individual learner's responsibility for learning and personal choice in selecting activities, provided leaders with opportunities to better understand their reports' needs, and ease in providing individualized content.

The COI model provided in the literature combined with just-in-time support can be used to understand the elements of designing and facilitating CMC for the new generation of leaders and their reports. Participants showed interest and readiness for on-the-job PD using ML and social learning strategies.

Methods for implementing ML included engaging the entire team in the PD of the leader, supported with social learning strategies, delivered on-site through mobile devices chunking the content. Participants chose the time and content most convenient to their needs. Findings suggested that the best use of ML is in support of creating shared meaning through face-to-face co-worker relationships and trust building in order for quality learning outcomes to occur. For company leaders interested in developing ML for their PD, a review of the several models of learning supported by CMC were provided including the COI model with its complex interplay of teacher/leader facilitation, cognitive development factors, and optimal levels of social presence to support participants' cognitive growth.

ML showed potential for meeting the needs of the emerging Generation Y millennial population with unique characteristics and changing needs for more efficient, accessible, and just-in-time feedback in a socially supported format on the job. The new Web 2.0 open environment is creating a wide socioeconomic impact that breaks down hierarchies and is leading "naturally to microcontent microlearning" with the mobile device as a "strong driver, and the network (community) [as] the enabler" (Jaokar, 2007, p. 45).

ML on the job is a realistic way to implement PD programs that engage the input of colleagues and reports, give leaders a way to plug into the perceptions of their followers, peers, and supervisors, and demonstrate value for the experiences of everyone on their team. Embracing everyone's experience is at the core of PD leading to improved workplace behaviors. ML has a large perceived potential to be a key element in the overall plan to create such an environment.

5.4 Recommendations for Future Study

A recommendation for a future quantitative study design would be to collect accountability data from PD using ML and social leaning and empirically test the relationship to PD outcomes chosen by the employer for the leaders and teams. Does ML produces a sustainable improvement in workplace behaviors? A study using the GIEL instrument would be suitable for this process. Replication studies across a variety of contexts could confirm or disaffirm the findings of this study for generalizing to a broader audience. Replication is recommended because of the positive findings reported by the participants for the use of ML and social learning strategies for PD on the job. Further studies could seek to empirically test the variables identified in this study to determine if there is a quantifiable relationship and the directionality.

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