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Health IT Applications Impact on Nurses' Perception of Performance: Reviewing Organizational and Personality Factors

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ABSTRACT

Applying information technology tools in the healthcare industry is an appropriate solution to integrate and record medical data and provide complete access of patients' information. However, the effectiveness of these technologies depends on their successful implementation and adaptation. This study addresses the impact of result observability, autonomy, perceived barriers, task structure, privacy and security anxiety on the perception of the performance of nurses using IT applications in healthcare. Furthermore, the effects of nurses' personality factors are examined as a moderator factors on the relationships between the organizational factors and nurses' perception of performance. This study proposes a model of the relationship of organizational variables as predictor factors on the perception of performance with EMR among nurses.

Multivariate linear regression was used to build models for the perception of EMR performance. Professional autonomy, privacy and security anxiety, and result observability are the best predictors for the nurses' perception of performance relationship. Personality factors do not have a direct relationship with the perception of performance; however, they have moderator effects on the relationship of the organizational factors and the perception of EMR performance.

Based on the findings of this study, the healthcare administrators could focus on increasing employee awareness about the results and tangible benefits of EMR applications and their effects on their performance. EMR development companies in collaboration with healthcare administrators could design the EMR applications more flexible in terms of professional autonomy and give the healthcare staff more freedom to make decisions and deliver care to patients.

KEYWORDS: Technology infusion, Organizational theory, Task structure, Professional autonomy, Electronic Medical Record (EMR)

INTRODUCTION

The goal of nationwide, interoperable health information technologies is to support healthcare safety, enhance quality of care, and provide cost-effective health services for patients (US Department of Health and Human Services, 2009).

Although healthcare information technologies, such as electronic medical records (EMR), decision support systems (DSS), and computerized physician order entry (CPOE), promise to enhance the efficiency and quality of care (Harrison, Koppel, & Bar-Lev, 2007), the effectiveness of these technologies depends on their successful implementation and adaptation. Due to the different professional training that healthcare staff receive, healthcare providers have fundamental differences from ordinary business user groups for adapting and accepting IT applications as a complementary tool in their work (Chau & Hu, 2002). Therefore, healthcare in comparison with other industries has a slower rate of adoption (Cresswell & Sheikh, 2013). To ensure that the technological changes are useful for both individual and organizational processes (Cresswell & Sheikh, 2013) and can improve the perception of healthcare performance, different kinds of interrelated technical, social, and organizational factors need to be reviewed. The implementation of health information technologies in organizations has different aspects and different pre-requisites that should be addressed before or at the same time of the implementation.

This study examines the socio-technical aspects of health information technology implementation and investigates the impact of organizational and personal factors on nurses' perception of their performance working with IT applications. This study also examines the extent to which employees' personality factors affect the relationships between the organizational factors and nurses' performance.

LITERATURE REVIEW

The Office of the National Coordinator for Health Information Technology (ONC) (US Department of Health and Human Services, 2009) defined health information technology as technologies that "enable the secure collection and exchange of vast amounts of health data about individuals," and collecting health data that improve the healthcare of the future. Health information technologies can improve the healthcare delivery, transparency, payment systems, efficiency, and population health (US Department of Health and Human Services, 2011). These technologies, such as electronic health records (EHRs), personal health records (PHRs), telehealth devices, remote monitoring technologies, and mobile health applications, are not being used to their full potential. In fact, healthcare is not only a slow industry in comparison with other high-risk industries in its attention to ensuring basic safety, but also, it is slow in implementing and adapting new information technology tools and applications. In 2010, basic EHRs were used in 15% of acute care hospitals and 25% of physician offices. After five years, in 2014, their usage increased and reached to 75% of acute care hospitals and almost 60% of physician offices (ONC/American Hospital Association (AHA), AHA Annual Survey Information Technology Supplement, 2014). Still most of the hospitals and physician offices use the basic form of health IT applications, not the advanced one and they do not use the full functionality of applications. However, there are not any statistics about the performance of working with the EHR applications in different hospitals and healthcare providers (Charles, King, Patel, & Furukawa, 2013; Hsiao & Hing, 2012).

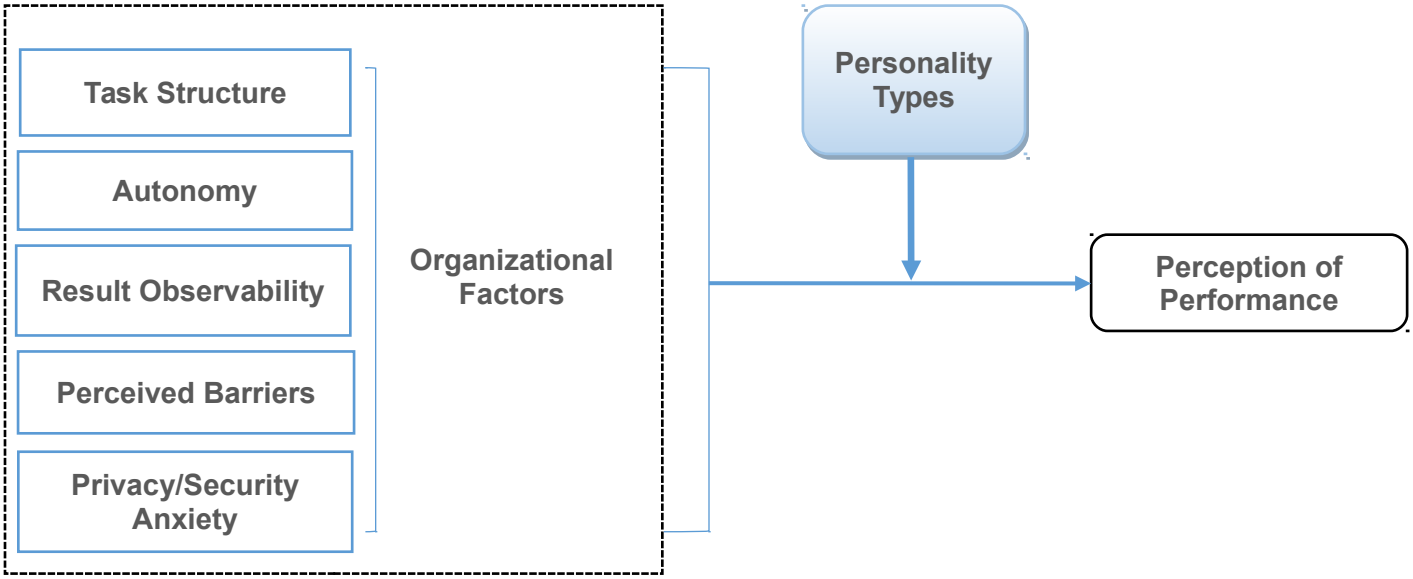
In 2009, the Health Information Technology for Economic and Clinical Health (HITECH) Act was approved as a part of the American Recovery and Reinvestment Act. Its purpose was to increase healthcare system adoption and meaningful use of health IT in order to improve health. Based on the Federal Health Information Technology Strategic Plan 2011–2015, five goals were determined: (1) achieve adoption and information exchange through meaningful use of health IT; (2) improve care, improve population health, and reduce healthcare costs through the use of health IT; (3) inspire confidence and trust in health IT; (4) empower individuals with health IT to improve their health and the healthcare system; and (5) achieve rapid learning and technological advancement (US Department of Health and Human Services, 2011).

Based on the five goals of the Health IT Strategic Plan, this study investigates the impact of IT applications on nurses' perception of their performance with the health IT applications

Research Questions and Framework

This study investigates the following questions: (1) What are the best predictors in the relationship between the organizational factors and nurses' perception of performance? (2) Do the personality factors have a direct effect on the perception of performance? (3) To what extend the personality factors have a moderator effect on the relationship of organizational factors and the perception of performance?
The research framework in the Figure 1 shows the effects of result observability, autonomy, perceived barriers, task structure, privacy and security anxiety on the nurses' perception of their performance in working with EMR. Also, it displays the moderator effects of nurses' personality types on the relationships between the organizational factors and the nurses' perception of performance.

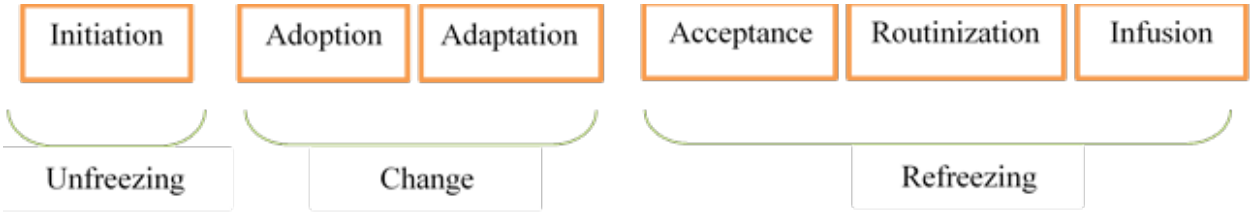
Figure 1: Research framework



Theoretical Framework

Lewin introduced the three-step change model in 1951. The model's three steps are unfreezing, changing, and refreezing. In every change process, there is individual and group resistance. However, by increasing incentives and decreasing barriers, the change process can be less challenging.
Kwon and Zmud (1987) proposed the IT implementation process model based on Lewin's change model. They extended the previous model with the contribution of post-adoption behaviors (see Figure 2).

Figure 2. Stage of change based on Cooper and Zmud (1990) Model



This study is focused on the implementation of new IT application/device(s) in healthcare. The change process in healthcare is the implementation of the new IT applications/device(s). The second stage has already been achieved in many hospitals while other hospitals are still in the first stage. However, the third stage of change has not yet been stabilized, so the results and the impact of this change on the performance and satisfaction of healthcare providers is presently unknown.

In 1962, Rogers developed a diffusion of innovation (DOI) theory to explain how, over time, an idea or product was accepted and diffused through a social system. Rogers (1995) introduced a five-stage model of the innovation decision process that included knowledge, persuasion, decision, implementation, and confirmation. Fitzgerald et al. (2002) argued that the successful diffusion of new knowledge could be a prerequisite to changes in concrete practices. This is an important element in professional or knowledge-based organizations, such as healthcare. Different studies concerning the DOI concept argued that the complex diffusion process will be influenced by the characteristics of the context (Fitzgerald et al., 2002). James, Menzel, and Elihu (1966) applied Rogers' model to American healthcare. According to James et al.'s (1966) study, the linear model of Rogers is appropriate within an uniprofessional network, where clinicians have the freedom to prescribe and are not limited within a wider organizational framework. Implementing EMR applications in healthcare was one of the innovations that diffused in this industry. Also, reviewing the diffusion of innovation theory helped to determine important factors that contributed to adopting EMR technology in healthcare. This theory influenced the current study's result observability and task structure variables. Based on Rogers (1995) theory, a goal of this study is to determine the relationship between the result observability of the new IT application/device (s) among nurses and the perception of their performance.

Organizational Factors

Based on different studies, the implementation and adaptation of health information technologies is not an easy job because of the interrelated organizational, social, technological, personal, and environmental factors (Cresswell & Sheikh, 2013; Vest, 2010; Rippen, Pan, Russell, Byrne, & Swift, 2013; Anderson, 2007). Although health IT applications are being used in hospitals and physician offices at different levels, administrators and employees know little about the organizational changes, costs, work processes, communication patterns, and time required for successfully implementing systems (Lluch, 2011).

According to Yee, Miils, and Airey (2008), the problems that are reported are not related to the technology itself but to the lack of socio-technical considerations. Of course technical problems such as lack of support, not having a user friendly interface, and not having customized applications may cause failure in health information technology implementation; however, the main problem is not technical, but rather an organizational one.

The current structure of healthcare organizational systems is not horizontally integrated, and it is difficult to encourage teamwork in this system (Ludwick & Doucette, 2009; Mostashari, Tripathi,

& Kendall, 2009; Aas, 2007). Team-based care strategies are needed for the successful implementation of IT applications (Mostashari et al., 2009).

Task Structure

Lluch (2011) noted that before the implementation of health information technologies, the healthcare organizational systems had been task-focused and centered on the provider or facility rather than on patients. Nowadays, healthcare administrators are trying to change from task-focused to process-focused care with the patients as the center, which means healthcare staff should look at the bigger picture when caring for patients. Also, health information technologies support value-added, patient-centered care tasks that have profound implications on workflow, work processes, and workload. Three studies mentioned that the technologies should be designed in a way that could adapt the roles, tasks, and the workflow of the organization (Westbrook, Braithwaite, Iedema, & Coiera, 2004; Westbrook et al., 2007; Coiera, 2009). However, the organizational structure, tasks, and workflow should be changed before the implementation of health information technology.

Halamka (2016), in the report 2016 Predictions for Health IT, mentioned that the workflow of health information technology applications will be redefined. He made an example of the current clinician duties while working with the electronic health records (EHR), dealing with how the clinician can enter 200 structured data elements, manage 140 quality measures, maintain eye contact with patients, and be empathic in only 12 minutes. He said that the workflow of EHRs need to be revised in 2016.

This study developed a task structure with a 5-item scale that measures what is expected from nurses, workflow change, work process change within the work unit, overlapping of the duties between different medical staff, and not fitting the EMR with the existing work process within nurses' work units.

Professional Autonomy

Wade (1999) defined professional nurse autonomy "as belief in the centrality of the client when making responsible discretionary decisions, both independently and interdependently that reflect advocacy for the client" (p. 310). Skar (2010) defined autonomy as the "nurses should have sufficient knowledge, power and authority to make a difference in what may happen to the patient" (p. 2227).

It is important to understand autonomy to clarify and develop the nursing profession in rapidly changing healthcare environments (Skar, 2010). The author described that autonomy depends on certain conditions, "such as the ability to make independent choices, freedom from coercion, rational and reflective thought and adequate information and knowledge" (Skar, 2010, p. 2226). Nurses need to make decisions and use the clinical judgments in patient care based on their own knowledge base (Freidson, 2001); however, implementing the new EMR systems at their work may limit this ability and reduce their professional autonomy. Therefore, nursing professional autonomy is one of the main factors that could contribute to the nurses' perception of performance and satisfaction with EMR that are measured in this study. Performance can be limited in a new setting while nurses' therapeutic acts are personal and portable features of their' self-understanding as nurses (Arbon, 2004).

Result Observability

Rogers (1995) defined result observability in the diffusion of innovation theory as the degree to which the results of an innovation (new idea, product, etc.) are visible to others. The results of

some products, applications, etc., are easily observed and communicated to some people, whereas some innovations and ideas are either difficult to observe or to describe to others. Based on Rogers (1995) theory, a goal of this study is to determine the relationship between the result observability of the new IT application/device (s) among nurses and the perception of their performance. Moreover, this study measures result observability with four items, including the tangible benefits of EMR, awareness of EMR objectives at work, recognition of the positive impact of EMR on the quality of patient care, and improvement of the chances of being promoted by using EMR.

Perceived Barriers

There are barriers and difficulties in adapting and working with the new IT application/device(s) such as technical support, workload, time consumption, and training. These impact the performance of nurses while they are working with them. Training is one of the main factors in adapting HIT applications (Tan & Lewis, 2010; Meade, Buckley, & Boland, 2009; Granlien, Hertzum, & Gudmundsen, 2008). Flynn, Gregory, Makki, and Gabbay (2009) described that training has a positive effect on staff's HIT applications adaptation and that adding financial incentives could increase the quality of training and encourage staff to learn the proper skills faster and operate the HIT applications.

According to Lluch (2011), technical "support has been identified as a catalyzer for the HIT uptake and the lack of it as a barrier" (p. 855). MacFarlane et al. (2006) mentioned that when technical support fails, frustration, and low use of technologies may happen. Support is not only technical; it also involves management and colleagues' support.

When a new application is implemented, organizational members need to learn something new and possibly complex and meanwhile displace what they already knew. Staff have to deal with the knowledge barrier related to the new application and the organizational changes after the application implementation (Robey, Ross, & Boudreau, 2002).

On the other hand, there may be a conflict between the old system and new knowledge; therefore, the ways that nurses deal with the requirements of new systems may not be completely correct and effective. Robey, Ross, and Boudreau (2002) described the misalignments in new software implementation due to the conflict between structures embedded in the software and structures embedded in the organization.

This study measures the perceived barriers with six items: the complexity of EMR, difficulty in learning how to work with EMR, availability of technical support, sufficient training, sufficient time to learn, and capacity of workload.

Privacy and Security Anxiety

Lost or stolen protected health information (PHI) may cost the U.S. healthcare industry up to $7 billion USD annually (Agaku, 2014), also data breaches can impact patients and healthcare organizations dramatically. Additionally, it may be difficult to protect and provide security for new technologies, such as mobile devices and file sharing applications, and by growing the reliance on these technologies, the vulnerability of patients' PHI to malicious intrusions may increase (Agaku, 2014). To decrease the risk of unauthorized health data disclosure, the Health Insurance Portability and Accountability Act (HIPAA) sets some rules to prohibit the access of unauthorized users to disclose the PHI. Ludwick and Doucette (2009) explained that a new implementation could be a source of anxiety and aggravation for the staff. There are different causes of anxiety for healthcare providers, especially when they have to work with new IT application/devices. Since they are not usually highly skilled with computer systems, they may

feel anxious about violating HIPAA privacy rules or losing patient data. The privacy and security anxiety of nurses while using EMR applications will be measured in this study.

Personality Factors

Most of the time, personality tests are done to determine the traits or factors that explain human behavior. Cattell (1956) explained that psychologists try to understand the traits or factors that result in predictable behavior or in understanding the ways in which a person feels, acts, or thinks that may cause his/her uniqueness.

The personality scale utilized within this current study (adapted from 16 personality factors) was developed by Cattell in 1940. 16PF measures sixteen primary traits as well as a version of the Big Five secondary traits.

The 16PF was standardized in 2000 for a population of over 10,000 people. The latest version of 16 primary traits are warmth (A), reasoning (B), emotional stability (C), dominance (E), liveliness (F), rule-consciousness (G), social boldness (H), sensitivity (I), vigilance (L), abstractedness (M), privateness (N), apprehension (O), openness to change (Q1), self-reliance (Q2), perfectionism (Q3), and tension (Q4).

The focus of this study is to find the most influential personality factors that have an impact on the adaptation of the new technology, and as a result, affect the perception of the performance of nurses after the new health IT application implementation. After reviewing different types of personality inventories and analyzing items that each of them measure, the modified 16PF was chosen for measuring openness to change, apprehension, self-reliance, and perfectionism characteristics in each nurse.

Work Performance

One of the most universal definitions of work performance is from Campbell, McHenry, and Wise (1990), who describe it as behaviors or actions that are relevant to the goals of organizations. Koopmans et al. (2011) explained that, based on Campbell's definition, work performance is more about behaviors, not results. Those behaviors are linked to the organization's goals, and work performance is a multidimensional concept. Viswesvaran and Ones (2000) defined work performance as "scalable actions, behavior and outcomes that employees engage in or bring about that are linked with and contribute to organizational goals" (p. 216).

Zadvinskis, Chipps, and Yen (2014) explained that the new health IT applications can promote efficiency and task achievement for nurses but may also decrease their performance. For example, nurses can increase their accuracy and thoroughness, do the real-time charting, and streamline processes with the barcode medication administration systems (BCMA) and electronic health records (EHR). On the other hand, these new technologies can decrease the nurses' perception of their performance when they require extra steps or hinder the nurses' ability to finish their tasks. Some of the examples of efficiency reduction from the nurses' point of view are inflexibility of EHR, login problems, reprinting labels, missing medication, reordering lab tests, and time restrictions for entering the patient's physical assessment after the scheduled time block (Zadvinskis et al., 2014).

METHODOLOGY

This study used cross sectional methodology. A convenience, non-probability-based sampling method was used in this research (Creswell, 2013). The sample comprised registered nurses who are enrolled in the nursing program at one of the mid-size public universities in southeast

Michigan. Most nurses in this study work at four different hospitals in southeast Michigan. Hospitals were ranked based on the number of nurses who participated in this study and are working in those four hospitals. All selected nurses in this study are registered nurses and are working in hospitals or health facilities. All of the sample members are in a RN+BSN or Master of nursing program and were registered in the Winter 2016 term. The total sample is 115 for this study.

Descriptive Sample Information

Out of 179 face-to-face registered students in different classes, 119 of them were accessible. Also, out of 119 students that met in a classroom, 91 of them were present and filled out the paper-based survey and the rest of them were absent. Therefore, the response rate for face-to-face classes was 100%. The online survey was sent to 293 online students and 24 of them responded, this is almost an 8.2% response rate. The total sample is 115 for this study.
Most of the sample members are female (85.2%); the male population is 14.8%. Nurses' ages are between 24–58 and the average age is 38.75 years old. Most of the enrolled students are in the RN+BSN program; only 20.9% are in the master's program. The majority of nurses work in Hospital 1 (30.4%), 16.5% in Hospital 2, 10.4% in Hospital 3, and 9.6% in Hospital 4. There are 21 other hospitals and healthcare facilities; 35 sample members work in those facilities. The four most commonly used EMR applications that nurses are using in their hospitals are MiChart (56.5%), Cerner PowerChart (12.2%), Point Click Care (7%), and CIS PowerChart (3.5%). The nurses' years of experience varied from less than one year up to 30 years. Their experience with EMR, however, ranges from less than one year to the maximum of 17 years.
The personality types scales were recoded as a "high" and "low" measurement. Based on the recoded data for the openness, 54.8% of the sample has the higher level of openness and 43.5% has the lower level of openness. Also, 65.2% of nurses have a higher rate of apprehension and 34.5% have a lower rate of apprehension. More than half of the sample, 50.4%, have a lower self confidence in comparison with the 47.8% of the sample that have a higher level of self-confidence. Interestingly, 63 (54.8%) out of 115 nurses have a higher perfectionism, and 52 people (45.2%) have a lower perfectionism. In summary, the sample of this study has the higher openness, apprehension, and perfectionism, and lower self-confidence, which is remarkable.

Instruments and Measurements

The validity of the instruments was examined by content validity. After extensive literature review and consulting with experts in the field, the main scales for organizational, social, and personality factors in this study were designed. Two experts from the School of Nursing and two experts from the College of Technology at the mid-size public university in southeast Michigan reviewed the questionnaire and gave their professional opinions. Furthermore, the Gagnon et al. (2003) study provided a comprehensive viewpoint and applicable guide to develop the scales. Scale reliability was examined by the Cronbach's alpha. Also, Data normality was tested by skewness and kurtosis tests. The results of skewness and kurtosis test were not acceptable for the result observability scale. Based on George and Mallery (2003) study the alpha coefficient greater than 0.7 is acceptable and if it is greater than 0.6 is questionable. A low value of alpha could be because of a low number of questions or poor interrelatedness between items or heterogeneous constructs (Tavakol & Reg, 2011). The correlation for task structure and privacy and security anxiety scale had run and it showed that there is a moderate relationship between different items of the scales. Therefore, the low value of alpha in those scales could be related to their number of questions. The same reasoning is valid for the low value of alpha in openness

and self-confidence scale. Table 1 and 2 display the organizational and personality factors scales normality and reliability results.

Table 1: Organizational Factors Scale Normality and Reliability Results						
Variables		**Result Observability**	**Professional Autonomy**	**Perceived Barriers**	**Task Structure**	**Privacy/Security Anxiety**
N	Valid	114	115	114	91	114
	Missing	1	0	1	24	1
Skewness		-0.720	-0.092	-0.577	-0.431	-0.346
Std. Error of Skewness		0.226	0.2266	0.226	0.253	0.226
Kurtosis		1.679	-0.656	1.994	0.409	0.118
Std. Error of Kurtosis		0.449	0.447	0.449	0.500	0.449
Cronbach's Alpha		**0.725**	**0.770**	**0.757**	**0.593**	**0.569**
Number of Items		4	2	7	5	3

Table 2: Personality Factors Scale Reliability and Normality Result					
Personality Types		**Openness**	**Apprehension**	**Self-Confidence**	**Perfectionism**
N	Valid	113	115	113	115
	Missing	2	0	2	0
Skewness		-0.701	-0.539	0.393	-0.298
Std. Error of Skewness		0.227	0.226	0.227	0.226
Kurtosis		1.388	0.536	-0.018	0.293
Std. Error of Kurtosis		0.451	0.447	0.451	0.447
Cronbach's Alpha		**0.676**	**0.789**	**0.625**	**0.719**
Number of Items		5	5	5	5

Data Collection

The tool for collecting data in this study was a paper-based questionnaire. The total number of questions was 60 plus 8 demographic questions. Nurses took 10–15 minutes to fill out the questionnaire. The questionnaire had 6 main parts and the number of questions was 60 plus 8 demographic questions. The questions were multiple choice, and the 5-point Likert scale were used to rank the answers.

All selected nurses in this study are registered nurses and are working in hospitals or health facilities. All of the sample members are in a RN+BSN or Master of nursing program and were registered in the Winter 2016 term. The target population of this study was the students who were registered in face-to-face classes in Winter 2016 because the survey was paper-based. However, with the recommendation of the chair of the nursing department and discussion with the dissertation advisor, the survey was also sent to the online student. The classes were held in different hospitals in southeast Michigan. Participants were informed about the subject of the study and were allowed to ask any questions regarding the research. Their participation was voluntary, and they were offered a gift card, if they filled out the survey.

Data Analysis

Multivariate regression was used to determine the best-fit models between the dependent and independent variables. The R square value of 33.9% of the observed variability in perception of performance is explained by the five independent variables. This is a good result with the real world data, although it is not as good as when each independent variable was examined alone.

The R with the value of 0.582 shows the good correlation coefficient between the observed value of the dependent variable and the predicted value based on the regression model. (see Table 3).

Table 3: Multivariate Variate Regression Between **Organizational Factors** and the Perception of Performance

R	R Square	Adjusted R2	Std. Error of the Estimate	Sig.
.582	.339	.300	3.574	0.000

Table 4 shows that the p-values for result observability, professional autonomy, and privacy and security anxiety are acceptable and less than the threshold ($p<0.05$). However, the p-values for barrier and task structure scales are not less than the 0.05. In fact, this result does not mean that task structure and barrier are not good predictors alone or in combination with other variables, they just do not contribute significantly to the model being considered. Professional autonomy, privacy and security anxiety and result observability are the best predictors for the perception of performance relationship in this study. One of the reasons that perceived barriers and task structure were not selected in the group of main predictors was that perceived barriers were highly correlated with result observability and task structure and task structure scale is highly correlated with the autonomy and barrier scales. Therefore, they are not as effective as other independent variables in the perception of performance relationship.

Table 4: Coefficient of Independent Variables in the Perception of Performance Model

	Unstandardized Coefficients		Standardized Coefficients		Collinearity Statistics	
	B	**Std. Error**	**Beta**	**Sig.**	**Tolerance**	**VIF**
(Constant)	3.987	3.541		0.263		
Result Observability Scale	0.296	0.149	0.187	0.051	0.886	1.129
Autonomy Scale	0.982	0.314	0.345	0.002	0.647	1.546
Barrier Scale	0.197	0.112	0.202	0.082	0.596	1.677
Task Structure Scale	-0.123	0.180	-0.081	0.497	0.553	1.809
Privacy Scale	0.467	0.232	0.193	0.047	0.855	1.170

Based on the univariate regression, there is not any direct positive relationship between the openness and self-confidence and the perception of performance with EMR. Also, there is not any significant negative relationship between the apprehension and perfectionism, and the nurses' perception of performance. However, multivariate regression among organizational and personality factors showed the effect of apprehension, professional autonomy, perceived barriers, and privacy and security anxiety on the perception of performance. This model by value of 39.3% for R square is a better fit for the relationship of the organizational and personality factors and the perception of performance (Table 5). Unlike the previous model, the perceived barrier is a better predictor than a result observability (Table 6).

Table 5: Multivariate Variate Regression Between **Organizational and Personality Factors** and the Perception of Performance

R	R Square	Adjusted R2	Std. Error of the Estimate	Sig.
0.627	0.393	0.325	3.510	0.000

Table 6: Coefficient of Independent Variables in the Perception of Performance Model

	Unstandardized Coefficients		Standardized Coefficients		Collinearity Statistics	
	B	**Std. Error**	**Beta**	**Sig.**	**Tolerance**	**VIF**
(Constant)	.227	5.415		0.123		
Result Observability Scale	1.031	0.152	0.143	0.140	0.821	1.218
Autonomy Scale	0.282	0.317	0.362	0.002	0.610	1.638
Barrier Scale	-0.137	0.119	0.289	0.021	0.507	1.974
Task Structure Scale	0.642	0.190	-0.091	0.472	0.477	2.096
Privacy Scale	-0.071	0.247	0.266	0.011	0.729	1.372
Openness	-0.276	0.154	-0.049	0.644	0.695	1.438
Apprehension	-0.059	0.123	-0.235	0.027	0.695	1.440
Self-Confidence	-0.018	0.182	-0.032	0.748	0.778	1.286
Perfectionism	0.227	0.214	-0.008	0.932	0.821	1.218

The effect of personality factors as a moderator variable between the organizational factors and the perception of performance examined by running the univariate regression.
Personality factors have a moderator effect on the relationship of result observability and the perception of performance. It can be inferred that nurses with a lower level of apprehension can see more tangible benefits of result observability (R2: 0.194 Beta: 0.817). On the other hand, nurses with a higher level of openness can notice the concrete benefits of result observability better and its relationship with the perception of performance. Personality factors have a significant moderator effect on the relationship of professional autonomy and the perception of performance and satisfaction with EMR. More self-confident nurses perceive more professional autonomy, and their perception of their performance is higher (R2: 0.316, Beta: 1.778). Among different personality factors, nurses with higher self-confidence are realizing that ease of use and fewer barriers are the causes of higher perception of performance (R2: 0.323, Beta: 0.699). The findings of this study present that nurses with higher self-confidence perceive their task easier after the implementation of EMR, and because of that, their perception of performance in working with EMR are increased. This study shows that self-confident nurses are less concerned about the privacy and security of data and as a result, they have a higher perception of performance (R2: 0.120, Beta: 1.146 $p<0.01$).

CONCLUSION

The findings of this study demonstrate the importance of organizational and personality factors in adapting new EMR applications in healthcare. The healthcare administrators and information technology managers in the healthcare industry could focus on increasing the awareness of their employees about the results and tangible benefits of EMR applications and its effects on

their performance. EMR development companies in collaboration with healthcare administrators could design the EMR applications more flexible in terms of professional autonomy and give the healthcare staff more freedom to make decisions and deliver care to patients. Further, the healthcare administrators and EMR companies may need to make sure about the privacy and security concerns of users and reduce the chance of data loss and violating HIPAA compliance in EMR applications.

LIMITATION

The first limitation was the sample; the selected population included registered nurses, who are working in the southeast of Michigan hospitals and are currently registered in a RN+BSN program in the Winter 2016 semester. Providing a bigger sample with more variety of nurses may affect the results of this study. The second limitation is that the personality factors scale only included four specific characteristics with only five items in each scale; more types of personality with more precise measurement tools and a larger number of questions may affect the findings of this study. The third limitation is that this study used quantitative methodology. Applying some qualitative or experimental methodologies could affect the results and may clarify some findings of this study. The fourth limitation is the measurement of organizational and social factors; with a bigger research team, it is possible to consider more sub-categories in organizational and social variables and possibly discover more specific findings.

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