Understanding students' continued use of electronic medical records in hospital: task technology to performance chain approach

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Abstract

One of the main goals of research on information systems is to help end users and organizations use information technology effectively. Fieldwork practice trains students to apply their knowledge and work skills based on the standards of the health ministry in electronic medical record regulations. This activity also prepares students to live in their health information management profession. This study examined the willingness and ability to use electronic medical records in hospitals to determine how well students understand electronic medical records and what influences their use. This study was conducted at a hospital in Mojokerto, East Java, where students practice fieldwork. An institutional-based cross-sectional study was conducted to assess the acceptability of the EMR system among students at Mojokerto Hospital from July 1-31st, 2022. The sampling method used simple random sampling of 136. A structured questionnaire was adopted from the previous studies. The questionnaire consists of 16 questions from the TTF, the expected consequences of use (COU), Facilitating Condition (FC), utilization (UI), and Performance Impact (PI) constructs. Data were analyzed using SmartPLS version 3.0. The result is that Task-technology fit is associated with the expected consequences of use (P=0.00), Consequences of Use (COU) are associated with Utilization (P=0.00), and the Facilitating condition is related to Utilization (P=0.00). We can conclude that task technology fit is indirectly associated with Utilization because of the Consequences of Use (COU). Task-technology fit, and Utilization does not affect the performance impact. This study can continue by testing the construct variables by the students on the field trips and by health-care providers such as nurses and doctors.

Introduction

One of the main goals of research on information systems is to help end users and organizations use information technology effectively. The rapid development of information technology in various fields is a common phenomenon in the digital era. The health sector is no exception, one of which is the use of information systems in health services. Using information systems in health services can benefit service providers such as hospitals and clinics. Advances in information technology in the health sector include the use of electronic medical records. The benefits include economic aspects such as cost savings, cost avoidance, increased revenue, profit contribution, and increased productivity. Other uses of clinical elements involve facilitating access to clinical information (in the form of medical history data for patient follow-up consultations), reducing service errors, and improving patient safety. Hospitals are highly standardized and regulated contexts in terms of regulatory oversight and professional roles and are operationally and technically complex. EMR is defined as a patient file that contains the following data: patient records, electronic prescription/dispensing, laboratory results, medical imaging and related reports, and hospital discharge reports. Medical record systems are extremely vulnerable to data degradation, forgery, and loss because they are stored in various healthcare facilities and manipulated in a centralized manner. In this case, many hospitals maintain the data of their patients in a database through an agent. However, even in this case, the patient must bring his file with him if he changes the doctor or hospital. This is an unreliable method for managing sensitive informa-
Electronic Medical Records (EMR) are crucial for healthcare practitioners to maintain medical information, provide treatment, and manage money. The benefits of EMR software can go beyond providing better care for patients. For example, it can incentivize healthcare businesses to use software. They are particularly relevant to single-practice clinics and family doctors, who do not necessarily exchange patient information across specialties. An EHR brings together information about a patient from many providers, and provides a more complete, long-term picture of that person’s health. One approach that can help explain the role of electronic medical records in improving performance is the technology-to-performance chain model.8

Students who study at hospitals are commonly referred to as fieldwork practice activities. Fieldwork practice aims to train students to apply knowledge and work skills. This activity also prepares students to live in their profession. In fieldwork practice, students can achieve learning outcomes related to electronic medical records. When utilizing electronic medical records, students must become professional medical recorders and health information management (HIM).

This study examined the willingness and ability to use electronic medical records in hospitals to determine how well students understand electronic medical records and what influences their use. The critical focus of information systems research is a better understanding of the relationships between system information and individual performance. For information technology to positively influence the performance of the individual, the technology must be utilized or exploited and follow the task in question.

The research model conducted by Goodhue and Thompson (1995) uses a comprehensive model of two complementary things: user attitude as a predictor of Utilization or Utilization and Task Technology Fit as performance predictors. The essence of the model is that for information technology to positively impact performance at the individual and organizational levels, the technology is utilized and appropriate to the type of work. Goodhue and Thompson tested some of these task technologies in the performance chain (TPC) model, showing that there is an effect of significant utilization and Task Technology Fit on performance impact. The TPC model has seven variables, namely, the expected consequences of use (COU), affect toward used (ATU), social norms (SN), facilitating conditions (FC), Task Technology Fit (TTF), Utilization (U), and performance impacts (PIs). Their research did not test the Task Technology Fit relationship against Expected Consequences of Use, Affect Toward Use, Social Norms, habits, or facilitating conditions. Oliveira et al. (2014) emphasized that TPC measures how technology supports individuals in the performance of their official tasks or duties. Moreover, TPC is an alteration between the task requirements, abilities of an individual, and functionality of technology.11

This research will re-examine some technology-to-performance chain (TPC) models by using the mandatory use setting of electronic medical records in East Java Hospital based on student perception.

### Materials and Methods

This study was conducted at an East Java hospital, where students practice fieldwork. An institutional-based cross-sectional study was conducted to assess the acceptability of the EMR system among students at Mojokerto Hospital from July to 1-31st, 2022. The sampling method uses a simple random sampling of 136. A structured questionnaire was adopted from the previous studies. The questionnaire consisted of 16 questions from the TTF, the expected consequences of use (COU), Facilitating Condition, Utilization, and performance impact construct. Data analysis using smartPLS 3. Structural equation modeling (SEM) has become an important statistical tool in social and behavioral sciences. It can model nomological networks by expressing theoretical concepts through constructs and connecting these constructs via a structural model to study their relationships. In doing so, random measurement errors can be taken into account and empirical evidence for postulated theories can be obtained by means of statistical testing.

This study has three hypotheses.

- **H1:** Task-technology fit is positively associated with expected consequences of use.
- **H2:** Task-technology fit will be positively associated with performance impact.
- **H3:** The expected consequences of use are positively associated with utilization.
- **H4:** Facilitating conditions are positively associated with utilization.
- **H5:** Utilization is positively associated with the Performance Impact.

The research model is shown in Figure 1.

### Results

Based on the regulations of Health Ministry No. 24, 2022, hospitals must implement electronic medical records. Electronic medical records advise that a standard electronic medical record application should include hospital patient history, clinical chart-
ing, lab and X-ray order results, patient referrals reports, fee schedule, and interoperability of systems among other features. Individual thought units were used as the units of analysis. The unit of analysis used was individual thought units. The respondents were comprised of 87 women and 49 men. The data were analyzed using SmartPLS software. Stage 1 involved bootstrapping. Bootstrapping only calculates the level of significance or significance of the direct, indirect, and total effects, and also calculates the significance of the outer loading and outer weight. From the bootstrapping results, some are not significant, so variables are reduced/eliminated. The result is shown in Figure 2.

Based on the bootstrapping results, some do not directly affect the endogenous variables, namely TTF to PI and Utilization to PI. Bootstrapping in Stages 2 and 3 yielded the best model. There were codes for facilitating condition (FC), TTF, expected consequences of use (COU), and utilization. The variable performance impact is not significant; therefore, it was eliminated. The data show a significant difference (sig. ≤ 0.001) from FC to Utilization, TTF that affected the expected consequences of use (COU), and the expected consequences of use (COU) affected to Utilization (sig. ≤0.001) (Table 1).

Thus, the Facilitating Condition had a positive effect on Utilization (P ≤ 0.000), Task Technology Fit had a positive effect on the expected consequences of use (P ≤ 0.000), and the expected consequence of use had a positive effect on utilization (P ≤ 0.000).

The results indicate that students continued to use the EMR based on the facilitation of hospital dan they know the consequences of using the EMR and know that it makes it easy to improve productivity.

Based on Figure 3, we get information that all loading factors > 0.7 and P value < 0.05, indicating that the observed variable can measure the latent variable.

<table>
<thead>
<tr>
<th>Table 1. Path coefficients.</th>
<th>Sample mean (M)</th>
<th>Standard deviation (STDEV)</th>
<th>T statistics (T/STDEV)</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Facilitating Conditiong -&gt; Utilization</td>
<td>0.679</td>
<td>0.043</td>
<td>15.890</td>
<td>≤ 0.000</td>
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<td>Task Technology Fit -&gt; the expected consequences of use</td>
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<td>0.047</td>
<td>14.435</td>
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<td>the expected consequences of use -&gt; Utilization</td>
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<td>0.054</td>
<td>4.778</td>
<td>≤ 0.000</td>
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<tr>
<td>Utilization -&gt; Performance_impact</td>
<td>0.197</td>
<td>0.112</td>
<td>1.713</td>
<td>≤ 0.087</td>
</tr>
<tr>
<td>TTF -&gt; Performance_impact</td>
<td>-0.115</td>
<td>0.110</td>
<td>1.025</td>
<td>≤ 0.306</td>
</tr>
</tbody>
</table>

Figure 2. Exogen variable testing.

Figure 3. SmartPLS output.
The hypotheses were as follows:

H1: Task-technology fit is positively associated with the expected consequences of use (Sig. ≤ 0.000).
H2: Task-technology fit is not associated with performance impact (Sig. ≤ 0.306).
H3: The expected consequences of use are positively associated with utilization (Sig. ≤ 0.000).
H4: Facilitating conditions are positively associated with utilization (Sig. ≤ 0.000).
H5: Utilization is not associated with the Performance Impact (Sig. ≤ 0.087).

Discussion

In developed countries, the healthcare sector has consistently tried to maintain an EMR system with the aim of reducing costs and improving the quality of healthcare services. Past empirical evidence documented a causal link between TTF. 17-20

According to the current research, the TTF of EMR influences student COU so that EMR, which is easy to use, easy to learn, user-friendly, and compatible, can increase productivity, effectiveness, performance, and complete student activities more quickly. Another study result verified that both task characteristics and technology characteristics affected students’ perceived TTF, which significantly contributed to their perceived usefulness, confirmation, and satisfaction with technology. 21,22

The TTF of EMR not associated with performance impact (Sig. ≤ 0.306) because students tend to only use and have no impact on performance. because it does not have an impact on performance, the electronic medical record is not suitable and fit for use by students. 9,23 Students with a positive impression of their activities will be able to increase the intensity of EMR use.

The expected consequences of use will be positively associated with Utilization (Sig. ≤ 0.000), that the TTF of EMR influences student performance impact (PI). It is easy to use, easy to learn, user-friendly, and compatible with student activities that affect the performance impact felt by students. RME is a solution that effective for the needs of the task or activity of a student. 24 Overall, by using the EMR, if there is any, students will feel satisfaction so that their performance can increase. This shows that task suitability will be able to improve individual performance. 25 Electronic medical records are expected to increase productivity and effectiveness in activities but have not been able to encourage students to utilize and increase the frequency of using electronic medical records. Therefore, it is hoped that there will be empowerment of existing features such as special features for students such as special student accounts so that access rights can be maintained. 26

Facilitating conditions directly and significantly affect the Utilization (Sig. ≤ 0.000). This result like another finding that facilitating condition significant affect the utilization. 27,28 The influence of facilitating conditions on the behavioral intention of individuals to use a new system has been examined in the literature in different contexts such as mobile learning, electronic tickets, social media, and online banking. 29-33 The result matches with other studies in that the key issues here included the appropriate use of systems in communicating with other healthcare providers, miscommunication about updates and changes, and miscommunication because of documentation in different places. Prior studies have also identified issues in communication-related to the use of specific e-health innovation products, such as telemedicine, CDSS, and health information system. 34

Conclusions

Task-technology fit is associated with expected consequences of use, task-technology fit is associated with affect toward use, and task-technology fit is associated with performance impact. We can conclude that task technology fit is associated with performance impact. This study has limitations in that not all variables were tested, and there were still few samples. This study can continue by testing the construct variables to healthcare providers such as nurses and doctors.

References


