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Original Article

Information Technology Governance Implementation: Cultural Impact Caused by Top Management

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Abstract *- The growing integration of IT into the higher educational system increases the need for universities to govern IT resources more effectively. Previous research on the ITG of Malaysian higher education institutions has revealed that the overall awareness of ITG has been low. This study strives to investigate the impact of top management in the formation of culture within ITG, as top management remains the most powerful party in dictating the direction of IT in universities. Two technical universities with different ITG structures are chosen as case study subjects. Five respondents with at least ten years of IT experience are chosen, each from two technical universities as the primary targets for qualitative interviews. Thematic analysis is used as the primary method to analyze both manifest and latent content for this study. Findings have revealed that the IT prioritization of top management heavily impacts the implementation of ITG in the universities. Low IT prioritization has negatively impacted the implementation of ITG. Meanwhile, a university with a high prioritization of IT can foster an environment that can promote the growth of a positive IT culture within the university. The findings can direct the attention of the university to redefining the roles and responsibilities of top management in terms of ITG to create a sustainable culture in ITG implementations.*

Keywords *- Governance, Higher education, Information technology, Organizational culture, Top management.*

1. Introduction

IT has been gradually integrated into the educational system of higher education. The recent global COVID-19 pandemic has caused Malaysia to alternate from traditional teaching and learning activities to online-based learning. The new age of digital learning will certainly impact current and future educational program delivery. Previous research has revealed that electronic education, the facilities, and the environment available to create virtual courses, IT support and implementations of new technologies in research and the availability of high-speed internet could be the indicators of the implementation of IT in higher education [1]. The outbreak of COVID-19 has undoubtedly garnered the attention of higher education institutions on the utilization of IT in delivering educational programs. The lockdowns that occurred in Malaysia in 2020 and 2021 of Malaysia has reminded universities of the importance of having reliable IT systems to address such crises. In order to mitigate the impacts and risks that could be brought by a similar crisis in the future, higher education institution needs to hop on the trend of transformation in the educational system. The university must be better equipped to govern IT resources, whether or not the transformation happens now or in the future. In order to adapt to future transformation, the requirements for high-level IT personnel also intensified to a higher level.

In two of the most recent studies of Information Technology Governance (ITG) in Malaysian higher education institutions [2][3], IT awareness was found to be insufficient within the institutions. The studies revealed a lack of human expertise in ITG that led to improper implementation of ITG. Bianchi *et al*. [4] stated that it was especially hard to maintain the proper function of ITG committees when there are insufficient experts within the universities. The growing importance of IT in universities has required universities to be excellent at governing the increasing needs of IT resources within a restricted budget. Hence, ITG in universities has become vital for universities to integrate newer technologies into the educational system without disrupting the operations and processes in other areas. Since the human aspect of ITG in Malaysian higher education is considerably lacking, this study aims to gather more empirical evidence on the human aspect of ITG implementation in Malaysian universities. Organizational culture is chosen as the main perspective to represent the human aspect of ITG implementation, as the culture is formed under the beliefs of all university members. Organizational culture is a belief and frame of reference reflecting on how the organization and employees have committed towards the objectives. It resembles the schemes of interpretation imposed on the members of the organizations. The values of organizational culture evolve with the

organization and, therefore, are unique for every organization [5]. Therefore, this study investigates the culture formed by the university in dealing with ITG implementation as the culture within the university would reflect on the courses taken by the university in dealing with ITG issues.

Bianchi *et al*. [4] classified ITG research into two streams: ITG Forms and ITG Contingency Analysis. The first stream of research focuses on decision-making structure, while the second stream of research aims to uncover factors contributing to effective ITG for a specific organization. This study proceeds with the lens of the second stream and aims to understand how top management can impact ITG implementations in two specific technical universities in Malaysia. Empirical studies of ITG in public universities are still deemed scarce [6][7]. ITG is not a one-and-done effort; it is a framework required to be continuously developed and improved in order to increase compatibility towards new environments and technologies. Therefore, a sustainable and positive culture within the implementation is needed to ensure the continuous improvement of the framework. In ITG, the board of directors and top management play a crucial role in determining the guidelines and policies regarding IT strategies. In other words, top management dictates the direction of IT moving forward. Hence, this study aims to discover how top management could impact the formation of culture within ITG implementation. The exploration of the impacts of top management in the formation of culture would provide more empirical evidence for universities to redefine the role of top management in ITG based on the results and take references on the actions that could build a positive IT culture to reinforce ITG concepts in the implementation process. In order to determine the culture formed in the universities, this study first investigates how top management aids or causes obstacles to middle management in terms of ITG implementation. Then, this study concludes with the culture formed based on 1) the actions and values of top management on ITG implementation, 2) the alignment of top management and middle management in the implementation, and 3) habits found during the implementation. These inclusion factors are concluded from research [5].

This research attempts to answer the research gap and reduce the ambiguity of humans' role in the ITG implementation process. Instead of solely focusing on the content of ITG (what is being implemented), investigating human aspects in ITG through the lens of organizational culture provides alternative viewpoints on how the execution can also severely impact the overall ITG experience within universities. This study also attempts to reveal that top management can be one of the most influential factors in determining the success of ITG through its impact on culture formation within the organization. The perspective of culture formation can be utilized to help the beginners of ITG to set foot on the right foundation instead of drowning in the seas of ITG contents during their ITG startup.

2. Literature Review

2.1. Information Technology in Higher Education

Teaching, learning, and research activities conducted in higher education benefit from the utilization of IT, as IT is seen as one of the major tools available to improve the effectiveness and efficiency of the teaching and learning process [8][9]. With the rapid development of IT in combination with the recent global pandemic, e-learning has surfaced as one of the major tools utilized by higher education to deliver educational programs online. Through e-learning, a huge number of students can easily exchange knowledge with peers over an insignificant amount of time. Students are also able to develop self-learning techniques in the way of seeking and learning resources necessary to solve the issue at hand [10]. A recent article also revealed that IT aids in the discovery and development of student's cognitive abilities [11]. IT tools help the student to develop IT literacy and the ability to search and manage available information to the best of the ability provided by the infrastructures and facilities. Students can learn how to effectively scan and extract the information needed for projects and assignments. E-learning also diversified the types of content available to be distributed to the students.

In a sense, e-learning components can be classified into e-learning contents, e-tutoring, collaborative learning, and virtual classroom [12]. IT is now seen as the strategic asset required to improve the overall experience of learning and teaching activities. Integrating IT into the educational system fulfils the purpose of replacing traditional methods, providing real-time simulation and enhancing cognitive thinking, improving the ease and availability of communication, and creating a productivity tool [13]. Increased utilization of IT in educational activities could bring a major transformation to how educational activities are conducted in the future. One of the benefits of increasing the utilization of IT is the availability of teaching and learning resources for lecturers and students. Flexibility is improved because resources can be accessed anywhere with an internet connection as long as it is legally permitted. IT also mitigates the effect of the barrier of time and location. Communication and discussion activities between students and lecturers are also allowed to be elevated to a higher level due to the availability of social media. This would undoubtedly increase students' engagement in the educational program because of the ease of getting quality university resources. Guzman and Correa [14] revealed that relational mechanisms impact the maturity of ITG in a university.

Mature ITG influences the level of information quality flowing within the university, which would lead to the impact on the fulfilment of information needs required by various stakeholders in the university. This also includes how students and lecturers can obtain the resources and information needed for the educational learning and teaching process. Chauhan *et al*. [15] revealed that general applications could improve the

outcome of higher education students learning activities. Consistent utilization of IT tools in combination with formal settings also positively influenced the learning outcomes of higher education students. However, the study also revealed that not all subjects were hugely influenced by IT. The subject that requires more reasoning, logic, and physical involvement, such as medical and nursing, are still better delivered in the traditional way. IT can help enhance the understanding of the subject, but some require physical practices and involvement more than just understanding on paper.

2.2. Information Technology Governance in Universities

The approach of ITG varies for every organization. The implementation of ITG is affected by academic regulations enforced by every country. Universities need to adapt and implement ITG according to the business and IT objectives made possible by the environment forged under the rules and regulations of the government [6]. The construction of the ITG framework should always be able to direct and guide the university into achieving the strategies and objectives decided by top management. Bianchi *et al*. [4] have reviewed and concluded that identifying compatible ITG practices may depend on factors such as the size of an organization, the country of the organization, the type of industry involved, and the type of control held on the organization. One of the primary distinctive differences between universities and other industries is that the university's primary goal is to deliver educational programs to distribute knowledge, while other industries focus on creating economic value and generating profit. However, effective ITG should be able to guide the university into managing IT resources effectively towards the expected outcome, which includes reduced costs and effectiveness in delivering educational programs. Onate-Andino and Mauricio [16] concluded that no previous studies revealed the critical success factors in implementing ITG, especially in higher education. Still, the authors revealed that several ITG frameworks and models are being applied to higher education institutions. The models are ITG4U for a Spanish university, which is based on ISO38500; ISMG Model for a UK's university; ITG framework specifically designed to handle IT projects of the university; green ITG model aimed to reduce cost for private higher education institutions in Jakarta, and ITG model based on COBIT 5, a twelve elements framework for University Malaysia Sarawak (UNIMAS), and ITG framework based on the mechanisms of structure, process, and relational for public universities of Brazil and Portugal. These models for universities also revealed that the construction or creation of the ITG framework and model should be explicitly based on the ultimate objectives of the university. These studies indicate that universities and higher education institutions can use almost no framework universally. Bianchi *et al*. [4] have also reviewed and concluded that a universal ITG framework for all is generally not possible. However, these models can be referenced and aid universities and higher education institutions in creating an ITG framework compatible with final objectives.

2.3. Top Managements in Information Technology Governance

The strategic decisions of an organization correlate with governance and management. The scope of governance primarily lies in supervision and accountability, while management mostly focuses on operational management decisions [17]. Governance is covered by the board of directors and top management. In ITG, no one area can be clearly detached from the other. Most implementations of ITG have some impacts correlated with each other, and the correlations would lead to the final impact and result occurring in the organization. Nazief *et al*. [17] studied ITG implementation based on human behaviour. The study revealed that experts believed that awareness could impact the implementation of ITG.

Several factors were deemed to be vital in the contribution towards awareness. The key factor is understanding the concept of ITG, followed by the influence of budget, business perspectives and organizational culture. Awareness is a part of ITG in the aspect of humans, which has a huge influence in determining the success of ITG implementation. With the growing utilization of IT in higher education, the role of the CIO has expanded beyond the original scope of responsibilities. Pinho and Franco [18] reviewed and stated that the CIO is now part of the top-level executive team in the organization responsible for aligning organizational strategy and IT strategy. The decision-making responsibility has now shifted further into the strategic area, increasing the influence of the CIO in determining the success of ITG implementation. Frogeri *et al*. [19] have revealed people, skills, and competencies as the top enablers for ITG in current and future perspectives. The main highlighted point is the lack of personnel with adequate knowledge of ITG. Results also revealed that there was a lack of guidelines and policies to guide the integration of top management decisions into IT strategies. Hence, there was a lack of alignment between IT and business, mainly represented by top management. Before the integration of IT into academic activities, IT departments were mostly isolated from academic departments. The isolations enlarge the problems that occurred during the effort to achieve strategic IT and business alignment for ITG [20]. This indicates that top management plays a huge role in determining the success of ITG implementation in higher education institutions.

Bianchi *et al*. [4] revealed that awareness of the importance of IT on education at the board and top management level is crucial in implementing effective ITG. In this scenario, the CIO is the most suitable person with the ability to display the importance of IT to the other board members. The study further revealed that engagement of IT with academics could be further improved to manage IT issues occurring in the universities. Implementing IT budget control and reporting is also important, especially for universities always confined by budget restrictions. Cultural and political

factors, financial resources and the university's structural framework were also revealed to have an enormous impact on the technological integration of the university [21].

2.4. Organizational Culture in Universities

The formation of culture is based on organizational goals, values, norms, and behaviors that reflect the values and norms embedded within the organization. It is a unification of all beliefs held in alignment for all members. The compatibility and alignment between the organizational structure and the existing culture legitimize the implementation process within an organization. If the structure and culture are incompatible, either must be changed [22]. When the entire organization is committed towards fostering a positive culture, it will lead to organizational success. Top-down management style, lack of leadership, and overly focus on financial control have been proven to be the inhibitors of positive organizational culture. Organizational culture could facilitate excellence but also impediments that cause negative effects due to bad habits. Three major factors were concluded to be crucial in a positive culture, including the alignment of objectives between employees and the organization, the reward of exemplary actions and behaviors, and the creation of consistency in a systematic procedure. Organizational culture is affected by top management's decisions on the guidelines and policies enforced within the organization [23]. Top management must lead, communicate, and build towards the goals alongside the employees. Enable the growth and fulfil the needs of recognition of employees by empowering them in the effort towards achieving organizational objectives and goals. Past studies revealed that support, encouragement, and adequate roles and responsibilities in the organization helped develop innovation-oriented [23].

In university, organization culture comprises interpersonal relationships, the beliefs and concepts instilled, the disciplines, the condition to satisfy innovative and spiritual needs, and a union of shared goals [24]. Daneshmandnia [25] has revealed that trust and transparency have contributed towards organizational culture in higher education institutions, and both are believed to be major enablers in information governance functions. IT policies resemble the culture of control in higher education institutions. It was reported that executive management has the sole control over policy implementation.

However, the respondents raised the issue of the disparity in the interpretations of policies by various parties. The study has concluded that effective cultures in higher education institutions include facilitating positive behaviour in the organization and togetherness in resolving issues and achieving success [25].

3. Methodology

Two technical universities are chosen to be the primary targets for respondents due to an obvious and significant difference in the ITG structure. University X does not have specific ITG units in the structure, while University Y has a specialized ITG department. The difference serves as a major control in comparing the cases between University X and Y. In addition, both technical universities conduct practical-based teachings, which emphasise the availability of facilities that are at least comparable with outside industry. This elevates the requirement level in technologies, which would undoubtedly require a higher level of procedural governance of IT resources. IT middle managers are ensured to have at least ten years of IT experience to be selected as the respondents. The impact of strategic decisions made by top management would be felt the most by middle management since both top management and middle management are correlated in the strategic decision-making of ITG in the organization [17]. Therefore, the middle management of the IT centre is interviewed as the middle management is the one who could feel the most direct impact caused by the decisions made by top management. Middle management is required to execute the strategic decisions made by top management. Therefore, the strategic patterns or organizational values held precious by top management are mostly known by middle management. The respondents were interviewed with semi-open and open-ended questions to gather new insights into the university ITG context. Semi-open questions aim to direct respondents to the context of ITG, while open-ended questions allow respondents to freely comment based on their experience. The interview questions first focus on the ITG practices of their respective universities, followed by the top management's priority, the aid that was given, and the obstacles that were faced by middle management in implementing ITG. It was constructed with the assistance of a professor in the field of Information Systems (IS) from a regarded technical university. The interview questions are displayed in Table 1.

Table 1. Interview questions

1	Can you define ITG in your POV?
2	Can you briefly describe the ITG practices implemented in your university?
3	How do you feel about the ITG implementation in your university? Please explain.
4	How do you feel about the priority of IT in your university? Please explain.
5	In your opinion, is top management being supportive of ITG implementation in the university? Why? Please explain.
6	How did the university help in terms of conducting IT activities and mechanisms? Please explain.
7	What are the difficulties that you have faced in terms of conducting IT activities and mechanisms at the university? Please explain.

Table 2. Demographic of respondents

Respondent	IT Experience	Age Group	Position
X_1	24 years	50 – 60	Head of Info
X_2	20 years	40 – 50	IT Infra Leader
X_3	20 years	40 – 50	Dep Head of Infra
X_4	16 years	30 – 40	Head of IT Support
X_5	15 years	40 – 50	Dep IT Officer
Y_1	15 years	30 – 40	IT Senior Executive (Governance Compliance)
Y_2	19 years	40 – 50	IT Senior Officer (Resource)
Y_3	15 years	40 – 50	IT Senior Executive (Head of Governance)
Y_4	15 years	30 – 40	IT Senior Executive (Risk)
Y_5	17 years	40 – 50	IT Senior Executive (Strategic)

Table 3. The assistance of university X

Themes	Assistance
Best Practices	Top management benchmarks other universities for best practices (1) The current VC held monthly project monitoring meetings. (4)
Expert Consultancy	The IT steering committee has been planning for at least five years. We can hire external experts for opinions to understand the needs and technology. (1) If the project is very important, we will do an ad hoc group consisting of various consultancy experts. (5)
Structure	IT steering committee, endorse ICT policy brought up by faculty and decide which policies are suitable to be adopted. (2) The decision-making is highly dependent on policy; if it is not aligned with the policy, we cannot proceed. (5)
IT Awareness	Current VC is IT literate. It allows us to perform more easily because top management realizes the importance of IT. Previous VC did not focus on IT. (4)

Table 4. Obstacles of university X

Themes	Obstacle
Lack of Awareness	There is minimal impact on ITG. The awareness is weak and not ideal. (4) The scope of ITG is limited. We depend on the ITG's awareness of top management for improvement. (4) IT committee need to be IT literate. They need to know the issue and have sufficient awareness. The most important is IT awareness. (4)
Lack of Support	All budgets must be well justified to be supported (2) If top management does not support it, it is very difficult to request a budget for IT purchasing the most important is top management (3)
Lack of Effort	We update the information through social media to the committee, but it is in minimum effort. (2) Lack of financial ability causes the projects to be at a halt. Top management neglects the budget issue. Sometimes, we do not know who blocks the process. (4)
Lack of Practices	We used to have a balanced scorecard, but not anymore. This is a top-level management decision. (4) In my opinion, ITG in our university is ineffective. It has the standard but needs a lot of improvements. (5) High-level management does not truly understand the root cause of the problem. We need to consume extra time to research the problem because higher management cannot give details on their issue. (5)
Lack of Power and Acknowledgement	IT center cannot be at the bottom of an organization. It is easier to get decision-making rights if it comes from VC because sometimes our opinions on work are not well received by owners and top management. (1) The budget is taken care of by the finance unit. (3) Only one or two members with an IT background are on the IT steering committee. IT is not empowered. Academic people are more powerful than IT people. We are not empowered to voice out incompatibility in the blueprint made by top management. (4) Even if VC thinks a project is needed, he still needs advice from the treasurer on the budgetary condition. In the past, the treasurer will allocate a budget to us, but not for now. We propose our project and depend on the treasurer for approval. What usually happens is that what was approved initially is not agreed upon by the treasurer in the end. In the past, we failed to convince the treasurer to build our finance system. (4)

All interviews were audio recorded with the permission and consent of the respondents. The recording tool helps the interviewer avoid missing important points and contexts for various reasons. In order to mitigate the impact of subjectivism and to ensure reliability and validity in the qualitative approach, the audit trail method is taken as an approach to display clarity and transparency behind each decision so that independent researchers could come to a similar conclusion while tracing the steps [26][27]. The purpose of audit trails is to show the reader how each decision is made to achieve the objective of this study. For this, every quote from respondents that form the themes of this study is shown. Thematic analysis was performed to code and reveal themes related to the primary objective. Thematic analysis allows the researcher to analyze both the manifest and latent content of the data [28]. The first step in the analysis is to read and reread the transcript to familiarize myself with the data. Initial codes are generated, and the codes that are correlated are categorized into small themes that can properly represent the entirety of the codes in relation to the implementation of ITG. The themes are reviewed and categorized under a major theme. Themes and sub-themes were generated based on the quotes by the respondents. Two thematic maps of Universities X and Y are created to display the difference for further discussion.

4. Results

In this study, a total of 10 IT middle managers were selected as the primary respondents, five from each technical university. The universities are regarded as University X and University Y in this research. Table 2 reveals the respondents' demographics, including the years of IT experience, age group, and job position of each respondent in their respective universities. All respondents were selected based on the organizational chart provided by both universities.

All respondents have at least 15 years of IT experience, and most of them are within the age group of 40 – 50 years old. The respondents all hold an influential role and position within the IT centres of each respective university and are familiar with the ITG in their universities.

Based on the interview results, the quotes from the respondents are first categorized into two sections. The first section is named “assistance”, and the second section is named “obstacles”. “Assistance” primarily includes the quotes where respondents felt like they received help from top management during the ITG implementation process. In contrast, “obstacles” include the hindrance they have felt or caused by the decisions of top management during the ITIG implementation process. The number shown beside the quotes represents the numbering of respondents from each respective university. Table 3 shows the themes of “assistance” in University X, and Table 4 shows the themes of “obstacles” in University X. Both themes provide a picture of how ITG implementations are carried out in University X.

Table 3 revealed that top management did benchmark other universities for practices. The current VC also made an effort to monitor the ongoing project. The hiring of external experts was made available by top management when needed. The current structure in the university also helped in setting up policies and guidelines for IT decision-making. The structure is also connected to best practices and external consultancy because top management consulted external experts' opinions in the IT planning decision-making. Current VC realized the importance of IT, thus making the work easier than before.

The “obstacle” for University X is classified into five categories, which include lack of power and acknowledgement, lack of support, lack of practices, lack of awareness and lack of effort. Table 3 revealed that lack of power and acknowledgement from top management are felt the most. The quotes from respondents revealed that the top management of University X did not prioritize IT that much. IT units were not given enough authority to voice their opinions. Even in the IT steering committee, the composition of members is skewed towards academics. Respondents think that the impact of ITG is not ideal because IT awareness on top management is insufficient. University X also lack practices in determining guidelines and procedures, which causes extra time wasted in dealing with issues. Combined with the response from the themes of “lack of power and acknowledge”, top management also revealed a lack of support. The effort was also revealed to be minimal regarding practices and guidelines.

Overall, respondents from University X felt more obstacles than assistance from top management, the primary factor being the lack of power and acknowledgement of IT. IT middle management in University X was not given enough control or sufficient involvement by top management, even in the IT decision-making process. IT middle management in University X felt like they were not supported by top management, and the effort to make improvements was not seen or negligible. The ITG implementation of University X was not heading towards the direction that IT middle management wanted.

Respondents in University Y have totally different opinions on the top management of their university. Based on the response, IT middle management in University Y has provided more themes in “assistance” than “obstacle”, indicating that top management in University Y has provided support to the implementations of ITG in University Y. Table 5 reveals the “assistance” that IT middle managements have felt from top managements in ITG implementation.

Table 5. The assistance of the university Y

Themes	Assistance
Continuous Improvement	Everything from the aspect of security, audit, and ISO27001 will be discussed for the purpose of continuous improvement. We will suggest to the IT steering committee based on the results. (1) We are reengineering our workflow to align with current technology. (1) Yes, they want to improve. We are always supported by top management, and top management also request us to organize workshop frequently to develop safety policy based on access privileges of staff and student. (2) The university is always looking into the governance. The improvement did not happen only at the end of the year; it happened all the time throughout the entire year. (4) Our top management always give advice to improve in the aspect of IT. In all the processes, we will factor in the work process and the growth of human capabilities. Suppose there are processes that they felt were not needed or unimportant in the IT steering committee meeting. In that case, the committee will suggest improving the work process and human capabilities. The person in charge of a project always needs to ensure that the involved staff gain new knowledge. From there, the university will get better work process and get staff that are more technically skilled (5)
IT Awareness	There is an initiative leader for the university's strategic planning in IT. He is the chairman of IT initiatives. (1) Mostly, our suggestions will be approved by top management. Top management will be involved in the discussion. We want top management to be involved. (1) For IT leadership, yes, our VC is from IT. He knows MAMPU. He also often updates us on the technology and guidelines (2) Top management support is vital for any idea's implementation. They also need to understand the situation and university policy to manage the request or issue (4)
Best Practices	VC will appoint one risk management officer for every department and faculty. (1) We offered the awareness training to everyone, including staff from business and administration. (1) We have one community in our university where there will be IT updates regularly. The community discusses the latest technology. We also have a system for mentor and mentee, or what we also call coaching. (2) We have IT initiatives, and every initiative has its indicators. We also measure them three times a year. (3) These mechanisms are important to contribute to producing an effective group. If we comply with all the guidelines and policies, it will lead to the best decision (3)
Structure	With these structures, I can speak and discuss with my higher-ups so we know what to address to the top management. (1) ITG is important because it must build a framework and policy for people to follow. Every work must refer to the blueprint and policy, and then only we can work smart and contribute towards our objectives and development. (2)
Empower-ment	VC will give approval based on the decision. He will ask for our suggestions and then give the decision in the meeting of the IT steering committee. (1) For IT budget control and reporting, every year, there will be a budget allocated to us, and we will report it at the end of the year on the budget that we have used (3)

Table 6. Obstacles of university Y

Themes	Obstacles
Lack of Practices	I have suggested that the director arrange a visit to the other university. I think the other universities improved because of the culture. I hope that our university can have quality units responsible to the whole university because there are no rules or policies like that right now. (1) I hope that we are not dependent on the top management for orders. We should just suggest it to the top management if necessary. If they are not content with the suggestions, we will just do it again. (1) We need more collaboration and involvement with the other departments, not only those from the ICT center (3)

In Table 5, the assistance discussed the most came regarding best practices, IT awareness, and continuous improvement. In best practices, respondents revealed multiple efforts were made to involve academic personnel in ITG implementation. Respondents also believed in the effectiveness of the guidelines and policies decided by the structures. Respondents in IT awareness mentioned that top management has shown significant support in conducting IT

activities. IT initiative leader is appointed to lead the IT activities in the university. In continuous improvement, top management has supported and encouraged the respondents to seek improvements in the work process and capabilities continuously. Top management also includes the opinions of IT middle management in decision-making. This reveals top management's acknowledgement and awareness of the importance of IT. Regarding structure, respondents believed that the blueprints and policies decided by top management would contribute towards the objectives and development.

In Table 6, the only obstacle felt by the respondents was a lack of practice. Several practices were felt needed by the respondents but have yet to be implemented in the university. Even with a lack of practices, respondents have responded in a tone of hoping for continuous improvement and a more complete implementation within the university. This could indicate that although the implementations of ITG in University Y are not necessarily up to the best standard, the respondents were content with the current progression and direction decided by top management.

Overall, respondents in University Y have been satisfied with the assistance from top management during the ITG implementation process. Based on the respondents from University Y, top management in University Y has supported the culture of continuous improvement in ITG. The IT middle management in University Y is positive with the culture, and they are actively seeking areas of improvement in the practices that University Y is lacking. Respondents in University Y are more pleased with the effort of top management than respondents in University X.

In comparison, top management from University Y has shown to be more supportive of implementing ITG. In contrast, top management from University X has limited visions of the potential of IT utilization. The difference in the priority of IT from top management between both universities is very evident. According to the respondents, top management from University Y has been very supportive in IT activities, though not by any means perfect ITG implementations in University Y have been steadily improving. The priority of IT from the top management of University X has improved ever since a vice-chancellor (VC) with an IT background has taken over. This also proposes an indicator that leaders in the universities need to be at least knowledgeable about IT to have sufficient understanding to be prioritizing IT in their strategic decision-making. University Y has presented more indicators of positive culture formation in ITG implementation, while University X has presented more indicators of negative culture formation in ITG implementation. The indicators are concluded through three inclusion factors mentioned earlier in the study [5]. The next section discusses the major themes and the evidence of cultural formation discovered from each university.

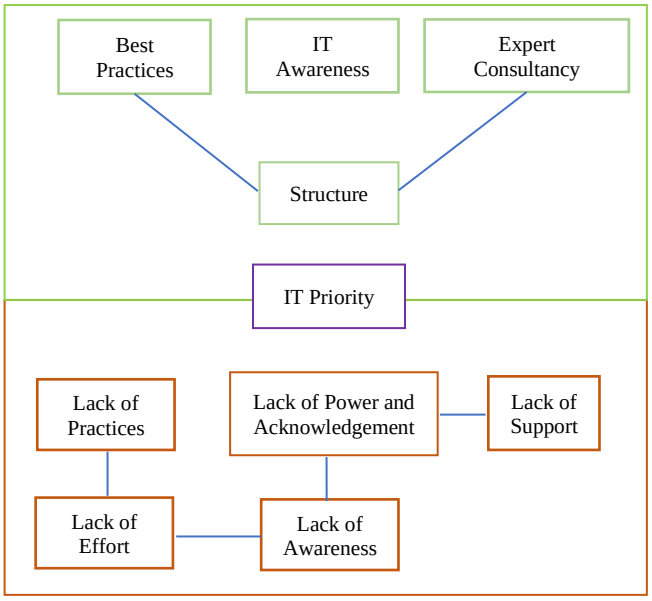

Fig. 1 Themes mapping for university X

5. Discussion

Based on the results, the respondents from University X felt more obstacles than assistance from top management during ITG implementation. Meanwhile, respondents from University Y felt more assistance than obstacles in ITG implementation from top management. The quotes from the respondents of University X have revealed that the previous VC of University X did not prioritize IT in university strategic decision-making. The transition from a VC that is not an IT background to an IT literate VC has improved the priority of IT utilization in University X. Top management from University Y have appointed an IT initiative leader to lead IT-related activities within the university. In combination with the support given in improving ITG implementation, top management from University Y is also deemed to have prioritized IT in the strategic decision-making of the university. Therefore, IT priority from top management is concluded to be the utmost important factor in determining whether assistance or negligence is given in the effort to implement ITG in the universities. Figure 1 shows the complete mapping of themes in “assistance” and “obstacles” in University X, and Figure 2 shows the complete mapping of themes in “assistance” and “obstacles” for University Y.

The extra bolded outline reveals the most important themes for University X. Regarding assistance, IT middle management from University X felt that the most assistance came regarding structure. The structure is correlated to best practices and expert consultancy because the formation of blueprints and policies starts from the structure implemented within the university. The blueprints and policies create the environment for the university to operate and implement ITG practices. Meanwhile, the IT steering committee's decision to employ external consultants reveals some level of IT

prioritization but is still insignificant to the overall effort. The importance of IT awareness is only felt when the current VC is IT literate. Only by then does the IT middle management of University X start to feel the assistance from top management. One of the major themes in the obstacles faced in University X is the lack of power and acknowledgement. Respondents reportedly feel they are not empowered enough to be involved in the decision-making process. This could be the impact of the previous VC that did not prioritize IT. Even when current VCs prioritize IT more than before, the blueprints and policies are planned for the duration of five years. Therefore, only minimum changes are expected until the next planning for the blueprint. Lack of power and acknowledgement from top management has caused IT middle management to lose support in decision-making. Respondents mostly feel that ITG in the university is ineffective. This is due to the lack of practices implemented to govern the direction of IT. Lack of awareness would cause top management to neglect the importance of IT, hence only giving minimum effort to solve the issues that occur in IT implementations. Lack of awareness of the importance of IT also causes top management to neglect the roles and responsibilities of IT middle management in ITG, resulting in the loss of power and IT authorities in the decision-making process. Overall, respondents from University X felt that ITG implementations in the university were severely lacking, mostly due to top management not prioritizing IT enough in the objectives. For University Y, the theme mapping is shown in Figure 2.

The major themes from the side of assistance for University Y are continuous improvement, best practices, and IT awareness. Meanwhile, only lack of practice is mentioned at the side of obstacles. In University Y, top management is considered to have prioritized IT very highly in decision-making. This could be shown in the support given by top management in order to improve the governance practices within the university continuously. The overall IT awareness for University Y is considered higher than that of University X as the top management in University Y specifically appoints IT initiative leaders to lead and govern IT activities in the university. IT middle management are empowered enough to be involved in creating and improving best practices. The empowerment of IT middle management in the decision-making of IT strategies also reveals that top management at University Y understands the importance of integrating IT into business strategies. Most top management think of strategies from business perspectives. Therefore, the involvement of IT middle management in decision-making enhances the alignment between business and IT strategies. As Maddux and Johnson reported, collaboration between business and IT personnel mitigates the impact of isolation management [20]. For the obstacle felt by respondents in University Y, the respondents mostly reply with the concern for continuous improvement. Therefore, the obstacle presented is more a suggestion to improve rather than an issue to be solved. Table 7 shows some differences between the approaches of top management in ITG implementations as reported by the respondents from both universities.

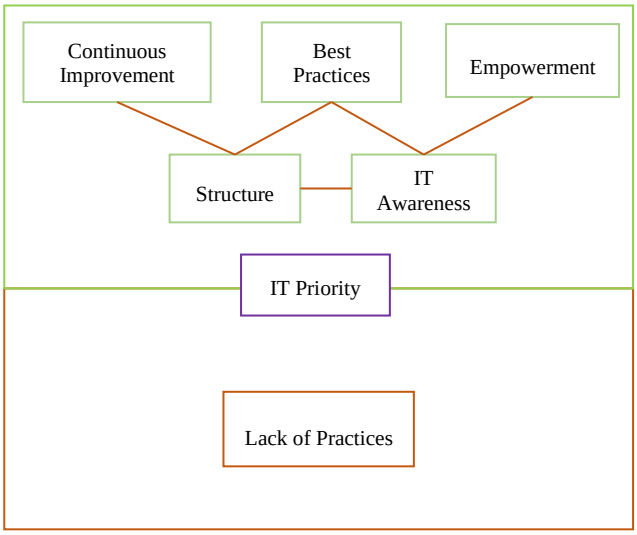

Fig. 2 Themes mapping for university Y

Table 7. Differences between university X and Y

	University X	University Y
Structure	No specific ITG units	Has specialized ITG department
Practices	Claimed to be ineffective. Not transparent in the decision-making process.	Lead by IT initiative leader. Believed to be able to produce effective group and process.
IT Awareness	IT awareness is reportedly low.	There is no direct claim on the status of IT awareness, but top management actions reflect the awareness of IT importance.
Budget Control	The budget is not allocated to IT units controlled by the finance unit.	All IT units have been allocated a budget by the university.
Power and Acknowledge-ment	Opinions of IT are not well received.	Opinions on IT are often considered and supported by top management.
Continuous Improvement	There are no reports of a continuous improvement culture.	Continuous improvement is supported and happens throughout the year.
IT Priority	Actions reflect the low IT priority	Actions reflect the high IT priority

5.1. Top Managements' Actions and Perceived Value in ITG Implementation

As mentioned earlier in the methodology, universities with different structures are specifically chosen for case comparison. For clarification, universities in Malaysia follow the Management Administration Modernization and Management Planning Unit (MAMPU) for ITG guidelines. The guidelines act as a foundation for universities to build on. Based on the results, University Y has made more effort to complement the guidelines with the university's policies and IT initiatives. Both universities follow the same guidelines, but University Y has developed ITG-specific units to address ITG implementations. The development of these units aligns both top management and IT middle management in the same direction towards the objectives.

Meanwhile, the scenario in University X reflects the isolation of practices between academics and IT where IT is not acknowledged enough in the decision-making process. IT awareness in University X is also reported to be low overall. This reflects that top management in both universities value IT differently, and top management in University Y has prioritized IT higher than top management in University X.

5.2. The Alignment of Top Management and Middle Management in ITG Implementation

Hiring an external consultant helps, but IT middle management in the university understands the compatibility issues the most. Since IT opinions are not acknowledged by top management, the voice of IT in University X has no impactful medium to raise the concerns towards top management. The designation of IT initiative leader in University Y has spearheaded the implementation of ITG. IT middle management in University Y has a direct representative to voice IT opinions and concerns to top management through the IT initiative leader. The role of an IT initiative leader is important to raise the awareness of top management on the importance of IT. With top management's unsupportive stance and the inability to control the budget, IT middle management in University X has been driven to a tight corner regarding ITG implementations. Unlike University X, IT middle management in University Y has been provided with a supportive culture and environment in the implementation process. The environment provided facilitates the growth of positive IT culture and behavior. The ability to manage your own budget opens opportunities for innovation while raising IT developments in the path constructed by business-IT alignment. The ITG practices in University X are claimed to be ineffective and may be caused by the refusal to acknowledge IT opinions within the university.

5.3. Habits Discovered in ITG Implementation

One of the key differences between University X and University Y is the formation of culture due to the prioritization of IT. In University X, IT was not prioritized enough to form a positive IT culture within the university. In University X, positive IT behaviours are inhibited by the unsupportive stance of top management. It would cause an overall downfall in the effort of implementations as IT middle management in University X felt like the efforts were unmatched and not acknowledged by top management. Without any form of alignment in the objectives, both parties are not able to foster a productive and sustainable culture in the implementation of ITG. Meanwhile, in University Y, the seed to seek continuous improvement in ITG is already embedded within the actions of IT middle management as the environment facilitated by the awareness and empowerment of top management allows the creation and growth of such culture within the university. This is mostly because IT middle management in University Y felt like top management matched and supported their efforts. As mentioned by Bianchi *et al*. [4], top management plays a crucial role in the implementation of ITG, and it is obviously shown in the intensity of engagement in ITG implementation for University Y.

5.4. Culture in University X and Y

Overall, University X could not form a positive culture within the university. As reported in the study [22], either must be changed when the structure and culture are incompatible. The change must be brought from the structure, starting from top management. Top management in University X needs to ensure that the values and objectives of the university are aligned with all parties involved. The result from this study is aligned with the study [23] as University X has revealed some positive culture inhibitors such as lack of leadership in IT, heavy concentration of power at the top without delegating proper responsibilities to qualified personnel, and heavily restricted the flexibility of budget within the university. No positive IT cultures could be formed because the image of an unsupportive stance from top management has already been embedded deep within the mindsets and values of IT middle management.

For University Y, IT middle management has received support from top management, is in alignment with top management regarding the values and objectives of IT, is delegated adequate responsibilities, involvement, and budget control, and is led by an IT initiative leader in the implementation process. The unification of shared values between top management and IT middle management has nurtured a positive mindset and beliefs, thus allowing the growth of a positive IT culture like IT acceptance and continuous development in University Y. Since a pro-IT culture has been created, more positive IT behaviour could be nurtured over time with the increment in IT knowledge and experience. The findings are aligned with studies from [22] and [23].

6. Conclusion

In conclusion, the priority of IT from top management heavily impacts the culture formed in implementing ITG in the

university. Cases from University X and University Y show opposite impacts due to the difference in IT priority. Low prioritization of IT in University X has negatively impacted the progress of ITG implementation as the importance of IT is hugely neglected by top management. Meanwhile, for University Y, the prioritization of IT has created a productive environment that allows the growth of a positive culture and a seemingly sustainable culture. In a positive, cultured environment, IT middle management in University Y is revealed to be more actively engaged in the effort to seek continuous improvement in ITG practices. Therefore, universities should ensure openness in accepting IT opinions in top management by promoting the importance of ITG through the role of CIO and IT initiative leader. The growing integration of IT into the educational system is inevitable. In order to maintain a sustainable and flexible ITG framework, a positive culture within the implementations is vital. Universities need to prepare for the upcoming challenge with a proper mindset embedded in top management to foster a positive and productive environment for ITG implementation.

7. Implications and Limitations

This study reveals two different results from cases with different priorities in IT. The findings should help universities understand the impact of top management on the culture formed in ITG implementation. Universities need to redefine the roles and responsibilities within the structure to welcome IT integration into the business strategies. The CIO's roles in promoting IT awareness in top management need to be specifically enhanced to improve business-IT alignment. Creating a role like IT initiative leader is one of the signs of support for IT activities on behalf of the university. Such indicators encourage the growth of positive IT behaviour in ITG implementations. The study of ITG implementations from a cultural perspective reveals an additional path for the university to improve. University lacking human expertise within ITG could not inherit a framework readily immediately because the concepts and procedures are too complicated for early-stage implementations. Meanwhile, promoting a positive IT culture ensures that the university moves in the right direction in ITG. Human expertise could be nurtured and cultured along the way while ensuring the compatibility of adopted ITG.

The primary data of this study was only gathered from the perspectives of IT middle management. Although IT middle management was believed to be the party who felt the most impact on the decisions made by top management, adding the perspectives of top management in their roles would provide a complete picture of the cases. Perspectives of top management on the factors influencing their priority on IT in the universities are needed to fully understand the activators and inhibitors of the formation of culture in ITG implementations of universities.

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