

Analysis of Methods for IT Service Management Processes Implementation in Higher Education Institutions

Methodenanalyse zur Implementierung von IT-Service-Management- Prozessen in Hochschuleinrichtungen

Yordan Yordanov

FDIBA, Technical University of Sofia

Sofia, Bulgaria e-mail: yordan.yordanov@fdiba.tu-sofia.bg

Abstract — Proper management of IT services is a critical success factor for every organization that deals with customers. Without IT management practices in place, an organization will not be able to achieve a high level of customer satisfaction and meet the demands of the dynamic workforce. Specifically, higher education institutions (HEI) often lack the required expertise and staffing to implement standardized frameworks and procedures in delivering IT services to their customers. This paper is a part of a broader research concerning the implementation of IT Service Management and IT governance in HEI and provides an overview and analysis of IT Service Management (ITSM) frameworks that are often implemented in this specific sector. It also suggests approaches for wider and more efficient adoption of these.

Zusammenfassung — Die effiziente Verwaltung von IT-Services ist ein entscheidender Erfolgsfaktor für jede Organisation, die mit Kunden umgeht. Ohne IT-Management-Praktiken wird ein Unternehmen nicht in der Lage sein, ein hohes Maß an Kundenzufriedenheit zu erreichen und die Anforderungen der dynamischen Belegschaft zu erfüllen. Insbesondere, Hochschuleinrichtungen (HEI) verfügen häufig nicht über das erforderliche Fachwissen und Personal, um standardisierte Rahmenbedingungen und Verfahren für die Bereitstellung von IT-Services für ihre Kunden zu implementieren. Dieser Beitrag ist Teil einer umfassenderen Forschung zur Implementierung von IT-Service-Management und IT-Governance in Hochschulen und bietet einen Überblick und eine Analyse von IT-Service-Management-Frameworks, die häufig in diesem spezifischen Sektor implementiert werden. Es schlägt auch Ansätze für eine breitere und effizientere Übernahme dieser vor.

I. INTRODUCTION AND HISTORY OF IT SERVICE MANAGEMENT

IT Service Management (ITSM) is defined as the implementation and management of quality IT services that meet the needs of the business (SysAid). The concept of ITSM is not new and it has been around since the days of mainframe computing during the previous century. Even though a formalized set of standards and procedures was not implemented and defined at this time, there has been the idea of IT Operations which dealt with processes such as incident, problem, configuration and change management. With the expansion of computer services provided, these processes were introduced and executed so that they could be delivered in an efficient, manageable, and consistent way. In the 1980s Richard Normann wrote the book "Service Management: Strategy and Leadership in Service Business" which provided a service-oriented view and thinking approach to organizations from all industries [15]. Combined with the rapid growth of information technology and the huge communication opportunities that the already expanding Internet provided, this service-oriented approach blended with IT Operations practices to become what we know today as IT Service Management.

ITSM describes best-practice methods for service strategy, design and delivery and there are multiple implementations of its processes in the form of different frameworks available. A framework is aligned to a specific purpose and describes the processes and practices it encompasses. The following section briefly describes common ITSM frameworks and later a comparison of their applicability in HEIs is provided.

II. OVERVIEW OF ITSM FRAMEWORKS

IT Service Management frameworks bundle together processes and guidance which are collections of best practices from organizations that have been providing IT services since the early days of Information Technology. Some of the most common ITSM frameworks available today are briefly described below.

A. Information Technology Infrastructure Library (ITIL)

ITIL is widely employed across IT organizations in various levels of maturity and implementation. It is the standard today to run IT operations [7]. This framework has been available since the 1980s when the UK government's Central Computer and Telecommunications Agency (later part of the Office of Government Commerce of the UK Treasury) provided recommendations about running IT - related services in the UK government which revolve around a process-based approach, corresponding to the Plan-Do-Check-Act design and management method, also known as Deming Cycle [3]. It defines a set of formalized processes (called practices in the current version 4 of ITIL as of this writing) that are commonly executed in organizations delivering IT services. Although ITIL provides guidance and best practices in running IT operations, it neither defines the exact way in which these practices must be run, nor does it require all of them to be implemented in every organization that decides to introduce ITIL. That is why, ITIL is

often accepted as a descriptive, rather than prescriptive framework and informally called “documented common sense” [1].

B. *Control Objectives for Information and Related Technologies (COBIT)*

COBIT is a framework for IT governance rather than IT Service Management. It was created by the Information Systems Audit and Control Association in 1996, initially as a framework for executing IT audit assignments. Due to the rapidly increasing reliance on IT for enterprises together with recent research concerning the productivity paradox which relates productivity to Information Technology [2], it has evolved into a comprehensive set of control objectives for IT management and IT governance [4]. The main purpose of COBIT is to better align the Information Technology strategy with the business objectives. Thus, its processes do not provide operational guidance on running IT in the organization like ITIL does, but rather focuses on connecting business with IT strategy so that IT is steered towards achieving maximum business value from its operations.

COBIT and ITIL are not mutually exclusive frameworks. On the contrary, to achieve a significant level of maturity in managing IT operations and strategy, they can both be introduced to complement each other so that COBIT provides the “what” and “why” and ITIL provides the “how” [17] without being extensively specific “exactly how”. This allows these frameworks to be implemented and tailored to any organization, regardless of industry, size, and IT maturity level.

C. *Microsoft Operations Framework*

Microsoft Operations Framework is Microsoft’s structured approach to IT Service Management [5]. It bears many similarities to ITIL but offers a more specific view on operating IT services using Microsoft products and technologies. Nevertheless, its applicability is not limited only to Microsoft-centric organizations, although it tends to be more prescriptive in its guidance on how to operate the IT processes.

D. *ISO/IEC 20000*

The ISO/IEC 20000 is an international standard for IT Service Management developed by the British Standards Institute (BSI) and stems from British Standard 15000 [20]. Today, it is the most recognized ITSM certification worldwide which states minimum requirements necessary to achieve organizational compliance. While ITIL provides a set of best practices and the organization behind ITIL, Axelos, can certify individuals seeking to prove their knowledge of ITIL-related practices and components, the ISO/IEC 20000 provides certification to organizations and is the only for an organization to achieve a globally recognized accreditation for an implemented standardized way of running its IT services and infrastructure.

E. *Other frameworks*

According to results from a survey conducted by Forbes Insight in 2017 about the state of ITSM across organizations from all sizes, companies have implemented at least some parts of ITIL and COBIT which together account for about 83%. MOF’s popularity is assessed at 34%, approximately the same as eTOM which is a Business Process Framework primarily used by telecom-oriented organizations [21]. Other methodologies like Six Sigma and Lean Six Sigma exist, whose main focus is not ITSM but rather concern product quality improvement and quality measurement. Nevertheless, such frameworks can be a valuable contribution and provide

additional support to the implementation of the “main players” described above.

III. THE STATE OF IT MANAGEMENT IN HIGHER EDUCATION INSTITUTIONS

Traditionally, higher education institutions are not known for implementing stringent standards for quality, IT management and other best-practice frameworks for running their day-to-day operations and strategy as a whole. Often, these institutions rely on internal academic staff like researchers and faculty to design the IT portfolio and run the IT infrastructure of the organization. Such personnel, although academically skilled in a specific scientific field, may not have the required expertise and experience to efficiently manage an IT service portfolio and the underlying infrastructure. In this way, IT is usually managed “on the side” rather by a full-time trained person which creates ineffective and unprofessional structures [10]. During the last few decades, the digital infrastructure complexity required to support the business of a modern educational environment has significantly increased. Training content is no longer delivered solely in classrooms, in front of blackboards and facilitated by dedicated campus computer labs. The massive digitalization of education, driven by the catalyzing force of the COVID-19 outbreak has shown that these traditional assets have already begun to lose their significance in knowledge delivery [16]. Moreover, as businesses are increasingly adopting approaches such as Bring Your Own Device (BYOD) in order to cut down on IT maintenance and support costs, universities are also embracing BYOD and cloud technologies as they have proven to be cost-effective and efficient. However, these methods also raise concerns about security and privacy as organizational data is no longer restricted to campus-owned devices but can be available on any device without any impedance from geographical barriers.

Apart from the purely technical side of managing the IT environments, IT teams are under increased strain from the constantly rising service expectations from students and users in general as today’s generation of end users expect quick turnaround times and personalized IT support [6]. Outside the university, these users are constantly surrounded by various social networks, virtual reality games, high-speed and almost omnipresent Internet access by latest generations of mobile networks, artificial intelligence algorithms and cloud-enabled applications which allow for entertainment, working and learning regardless of location. It is inevitable that users expect the same availability from the institution providing their education and for the organization to remain competitive and not fall behind in terms of efficient and secure content delivery, it is important to provide service guarantees in the form of Service Level Agreements (SLA) for all items in its service catalog. This requirement, however, poses significant challenges to the IT departments since the incorporation of a SLA would mean a considerable investment in IT systems, infrastructure and staff education to achieve the necessary service availability. According to a study conducted by Gartner in 2021, HEIs have made substantial investments in classroom technology in the form of video, audio, presentation, and content capture equipment, as well as IT infrastructure to increase capacity and support the remote synchronous or hyflex models of teaching and learning. Some of the funding used to purchase and deploy these assets, has been provided by one-time government infusions during the COVID-19 pandemic which, due to the urgency at that time, was performed in an ad-hoc manner and without the necessary planning. This equipment, however, requires continuous and ongoing maintenance in the amount of around 20% of the initial outlay per year [14] which, if not

provisioned, leads to its faster deterioration and shorter usable life expectancy.

As digitalization progresses with a fast pace in all industries, cybersecurity has never been as important as today and educational institutions are in no way less targeted than other organizations. The fast shift to online learning, training, and assessing has paved the way for cybercriminals to take advantage of the increased number of devices in use by students, faculty and staff which, due to lack of preparation time, have mostly been provisioned without proper protection and security plans in advance. This increases the attack surface of the institution as these devices, once they leave the IT department, fall out of scope of management, and become increasingly vulnerable in the hands of their users. As the impact of the pandemic fades out and students and educators return to auditory classes, these vulnerable devices are reconnected back to campus networks which greatly reduces their overall security. According to data from Microsoft Security Intelligence, in the period between 14. August and 12. September 2021 educational organizations were the target of over 5.8 million malware attacks which accounts for 63% of all such attacks. In addition, globally 44% of institutions in the educational sector were targeted by ransomware attacks [9] which greatly reduce productivity and ruin the organization's reputation. In general, the education industry has been labeled as the slowest to patch, averaging 18% of vulnerabilities addressed during the 12-week patch cycle [12].

IV. ADOPTION OF IT SERVICE MANAGEMENT AND IT GOVERNANCE PROCESSES IN HEIS

The overall effect of the issues described above could be diminished if IT governance and ITSM mechanisms had greater adoption among the HEIs. Gartner's Hype Cycle for Higher Education from 2011 showed that penetration of IT management frameworks in HEIs is rather limited with ITIL between 5% and 20% and COBIT – less than 1%. [8]. One possible reason for these results is that such frameworks are often implemented due to compliance and regulatory requirements and not because their advantages are fully understood, especially in the education sector where such requirements are not as stringent as in commercial organizations. HEIs, albeit not legally obliged to comply, could also benefit from the improvements these processes could bring in several aspects:

A. *Better comprehension and visibility of Information Technology*

The adoption of ITSM and IT governance processes could help HEIs evaluate their existing infrastructure and assess their overall IT maturity. Such an assessment is fundamental for understanding the current gaps and weaknesses of the IT processes and can aid in establishing the next steps for improvement.

B. *Better alignment of IT solutions with business objectives*

Lacking the required IT expertise, it is common that HEIs do not seek input from IT professionals and different departments take the initiative to adopt solutions without consulting field experts [18]. This has the potential to introduce a fragmented and scattered IT portfolio that does not necessarily correspond to the organization's objectives – to deliver training content and conduct scientific research in an efficient manner with the help of technological solutions.

C. *A streamlined path to digital transformation*

The non-profit organization Educause defines digital transformation in HE context as leveraging digital technologies to enable major educational improvements, enhance learner and instructor experiences, and create new instructional models

through policies, planning, partnerships, and support [11]. A successful digital transformation cannot occur ad-hoc, uncoordinated and unguided but requires the introduction of formal processes that always produce meaningful and measurable outputs that can be assessed and continuously improved.

D. *Increased stakeholder value*

Utilizing IT best practices and approaches reduces support costs for the organization and allows management and governance teams to focus on more strategic projects that increase the value for all involved parties:

1) Students receive a comprehensive set of IT solutions to guide them in their learning path – online learning management systems, online access to student data, collaboration and video conferencing software, secure remote access to digital resources, cloud-delivered and mobile-friendly applications. There are no multiple credentials and duplicate registrations - all systems are accessible using a single identity which is federated across all environments and secured using multi-factor authentication. Self-service capabilities and processes are in place to enable users to recover from account, sign-in and password issues without the need to contact the service desk.

2) Faculty can focus on developing teaching content and make maximum use of digital technologies to enhance learning experiences instead of losing time and dedicating efforts on setting up infrastructure, applications and providing support for various platforms. Educators should leverage their pedagogical and teaching skills to deliver the content in an efficient manner by use of the IT infrastructure and not be concerned with its maintenance and administration.

3) Staff members are more efficient in executing day-to-day administrative operations, they utilize specialized software and services that help them deliver high-quality support to students.

4) IT Teams are more proactive and can focus on enhancing the IT infrastructure, developing, and improving the IT service portfolio rather than “firefighting” and spending more time on handling incidents reactively. Processes like Incident Management and Problem Management are in place when such incidents occur, and they are used to enable continuous service improvement. In this way, the IT department no longer represents a costly support center, but becomes a strategic asset that delivers value to the organization.

5) Management officials benefit from results that are closely aligned with the business objectives. The organization's reputation and image are enhanced as students (who are treated as customers from a service delivery point of view) are satisfied and recommend the institution to other interested parties. This can possibly lead to a higher rank which measures its position among other institutions from the same type and is one of the most important metrics for HEI performance.

In overall, HEIs can significantly improve customer satisfaction by developing ITSM and IT governance best practices. These institutions have their own specific requirements and business processes and not all the practices described in the frameworks are applicable. Most frameworks, however, like ITIL, are not prescriptive and can be selectively implemented and customized to meet the required objectives.

V. CONCLUSION AND OUTLOOK

As digital transformation is underway in many industries, HEIs cannot afford to run behind if they want to remain competitive and valuable to students. The demand from the latter for digitalization, electronic content, high availability of resources and remote education fulfillment is constantly increasing, and the COVID-19 pandemic served as a catalyst for these processes. It showed that there is great potential in digital education, however it needs to be planned and executed appropriately to benefit from it. This requires changes in the way HEIs implement the Information Technologies which are the backbone of this transformation. To accomplish this goal, it is no longer sufficient to deliver IT services in an ad-hoc manner like in the past, when digital content represented just a fraction of the whole curriculum. A research report by Modern Campus in 2021 about the state of continuing education showed that in 2020 68% of adults considering enrolling in an education program preferred non-degree, alternative programming [13] which is the effect of educational institutions failing to meet the modern learner's expectations and demands. To stop this trend and revive student interest, HEIs need to transform and rethink the ways they deliver value to their customers. One step forward in this direction would be to embrace IT best practices, rely on IT experts to optimize operations and separate IT management from governance activities using proven frameworks like ITIL and COBIT. Failing to do so would have the effect of still empty classrooms and lack of interest in traditional university education, even in a post-pandemic reality.

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