

The migration process from commercial to open-source learning management system for sustainable capacity building in primary healthcare service

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Abstract

Data migration could be a complex yet necessary activity during the lifecycle of an information system. All the e-Learning resources and activity material for all the available courses were migrated from a commercial platform to the free and open-source Moodle platform to ensure the availability of necessary features such as ability to monitor progress of learners, assessing the learning and to ensure sustainability. The migration process was methodically planned and executed, preserving the integrity of the data and rectifying omissions, errors, and inconsistencies. Utilising the existing Moodle e-Learning platform of the Ministry of Health as a shared resource is a practical and more long-lasting method of delivering e-Learning materials with the goal of enhancing the competence of healthcare professionals.

Introduction

The Ministry of Health and Ministry of Provincial Councils and Local Government in Sri Lanka have embarked on a five-year project to strengthen primary healthcare in the island, named the Primary Healthcare System Strengthening Project (PSSP). The project's long-term goal is to fill a gap in the provision of people-centred primary healthcare services across the nation to increase both primary healthcare utilisation and quality [1].

With 71% of global and 81% of Sri Lankan deaths attributed to non-communicable diseases (NCD) [2], the Primary Healthcare Systems Strengthening Project has a significant focus on preparing the local healthcare system to meet this NCD challenge. Diabetes, cardiovascular diseases, respiratory conditions, and cancer were considered priority NCDs for this project.

E-learning is the practice of delivering educational materials and facilitating learning

experiences via the use of digital technologies. It includes a variety of strategies, including simulations, online classes, and virtual classrooms [3].

Due to the COVID-19 epidemic, which has compelled many academic institutions to move their teaching and learning online, e-learning has gained importance in the contemporary environment [4]. E-learning has a number of benefits in this situation, including the capacity to provide content asynchronously and remotely, letting learners learn at their own pace and according to their own timetable [5].

Additionally, because it enables students with impairments, geographic restrictions, or other limitations to access educational information from anywhere with an internet connection, e-learning can be more inclusive and accessible compared to traditional classroom-based education [5].

Challenges

One of the key gaps noted in the local primary

care setup is the need for an ongoing capacity-building programme for the medical officers attached to over 500 Primary Medical Care Institutions in the country. Dispersed geographical distribution with resulting transport challenges and difficulty in arranging cover-up doctors for the PMCIs favoured the adoption of an e-Learning approach.

A commercial e-Learning platform developed by a local software vendor company that hosts government and private e-Learning content for its subscribers was entrusted with content development under the direction of relevant directorates and units responsible for the content area. The medical officers received five courses from the learning management system. The topics covered in the courses included the function of the medical officer in the primary medical care institution and NCD related courses such as cardiovascular diseases, screening and managing NCDs and diagnosis and management of diabetes mellitus. Tuberculosis diagnosis and management was also recognised as an important course for those working at primary healthcare settings [6].

Monthly costs for the platform, lack of features, presence of errors, and not knowing how to use the commercial platform along with problems with creating material and making changes resulted in sub-optimal utilisation therefore, challenging the sustainability.

Migration to a sustainable e-Learning solution

The learning management system (LMS) Moodle, which is free and open-source, enables educators to design, deliver, and manage online courses [7]. It promotes e-Learning by offering a thorough framework for organising online courses and enabling communication, collaboration, assessment, and customised learning experiences for students. Due to its many features and affordability, previous literature considers Moodle as a sustainable way of delivering e-Learning content [8]. The Moodle platform ([http://elearn.](http://elearn.health.gov.lk/)

[health.gov.lk/](http://elearn.health.gov.lk/)) was jointly launched by the Health Information Unit (HIU) and the Education, Training and Research (ET and R) unit of the Ministry of Health for the continuation of education in the institutions under the direct purview of the ET and R unit during the pandemic. These institutions included PSM and paramedic training schools, nurses training schools and regional training centres. Since this platform was free, permission was obtained from the relevant authorities to migrate the content from the commercial platform to the Moodle platform.

A team of health informaticians worked together to coordinate the migration process. There are many strategies that can be used for the migration of information. Since the process needed to be completed within a limited time window, the Big Bang data migration approach was used [9]. Big Bang data migration is a data migration approach where there is transfer of all the data in one big operation from one system to another [9]. This method stands in contrast to other data migration strategies, where data is moved over a longer period of time in smaller batches. The migration process was carried out in four phases (Figure 1) [10]. The team conducted an initial examination of the content that was found within the courses that were hosted on the commercial platform or the legacy information source during the first step of source destination mapping in order to create an accurate picture. In addition to this, the storyboards that accompany each of the courses were utilised, so that the overall structure of the courses could be understood. Following the completion of an assessment of types of information contained within the source, an assessment of the features available within the destination was carried out, after which source and destination mapping was carried out for each of the materials. The material was first extracted from its source during the second phase of the process. This was performed while the live commercial platform was still in operation, and

the team took extra precautions to ensure that the users were not disrupted in any way during the process. The third phase was the intermediate stage of organising the material. During this phase, it was identified that there were certain materials in the legacy information source that were either missing or inconsistent. These inconsistencies were then compared to the storyboard that was provided. This was an issue that needed to be resolved before moving on to the next step. Therefore, discussions were carried out to rectify the shortcomings. The final phase was uploading the material to the destination, or the Moodle platform. To overcome the challenge of data quality concerns, following the migration process, the courses within the new system were assessed by an independent team of health informaticians. The medical background of the migration team was also useful during this assessment, where several omissions, inaccuracies, and inconsistencies in the content were identified and rectified accordingly. Almost immediately after the Moodle platform was made available in the year 2021, more than forty individuals enrolled in the

available courses (Figure 3). By the end of 2022, over 300 users were enrolled in the platform, following at least one of the five courses, and annually, more Medical Officers working in the Primary Healthcare setup are added as decided by the PSSP.

Conclusion

In conclusion, the features on the Moodle platform were compatible with the commercial source system, and the data migration process, when done methodically, was attainable in the given time frame. With the current economic crisis, a government organisation can afford to maintain the Moodle platform because it is free and an open source. Also, it is currently managed by the ET and R unit of the Ministry with the supervision of a team of health informaticians which further enhances its sustainability. Utilising the existing Moodle e-Learning platform of the Ministry of Health as a shared resource is a feasible and more sustainable approach to delivering e-Learning content for the purpose of capacity building among healthcare workers

Author Declaration

Author contributions: CW and SKPAF attended to information need identification, Data migration process planning and coordination, Gap analysis, Manuscript writing, Literature review and Revision of the Manuscript. Institutional decision making, resource allocation, supervision and final approval of the manuscript was done by AKSBDA.

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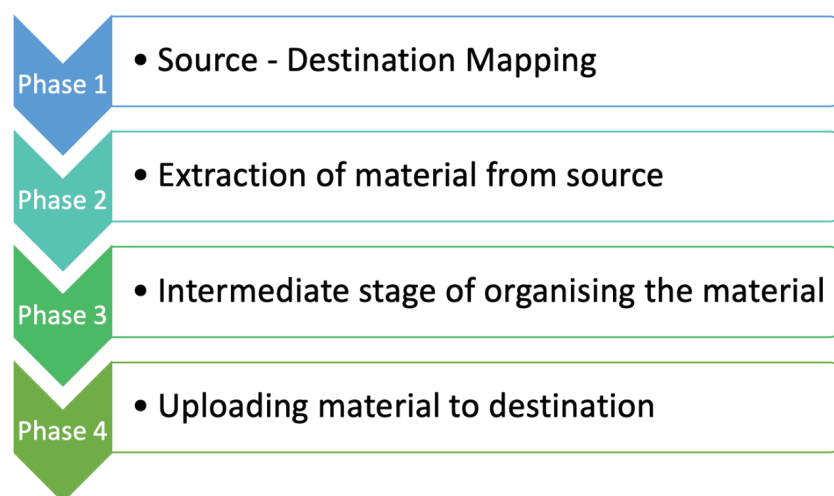


Figure 1: Phased out Source - Destination information migration process

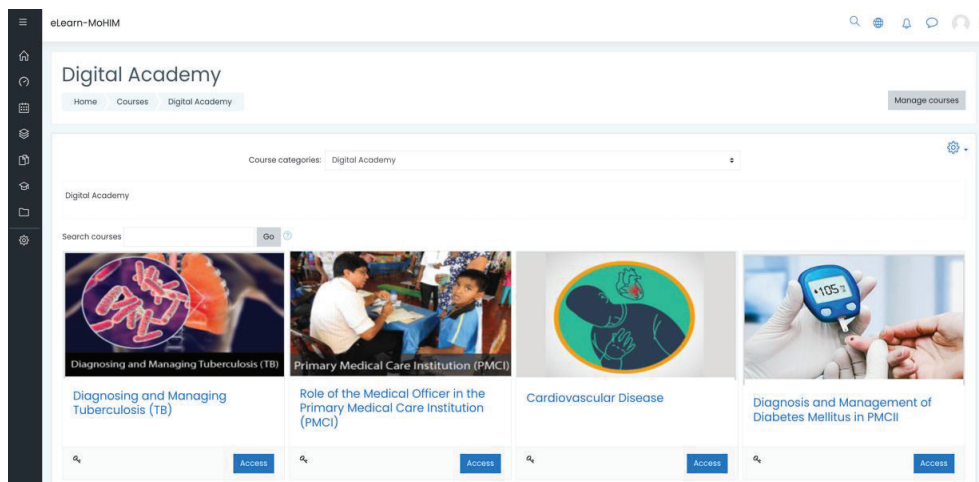


Figure 2: Courses within the Moodle platform following the Migration of the Material

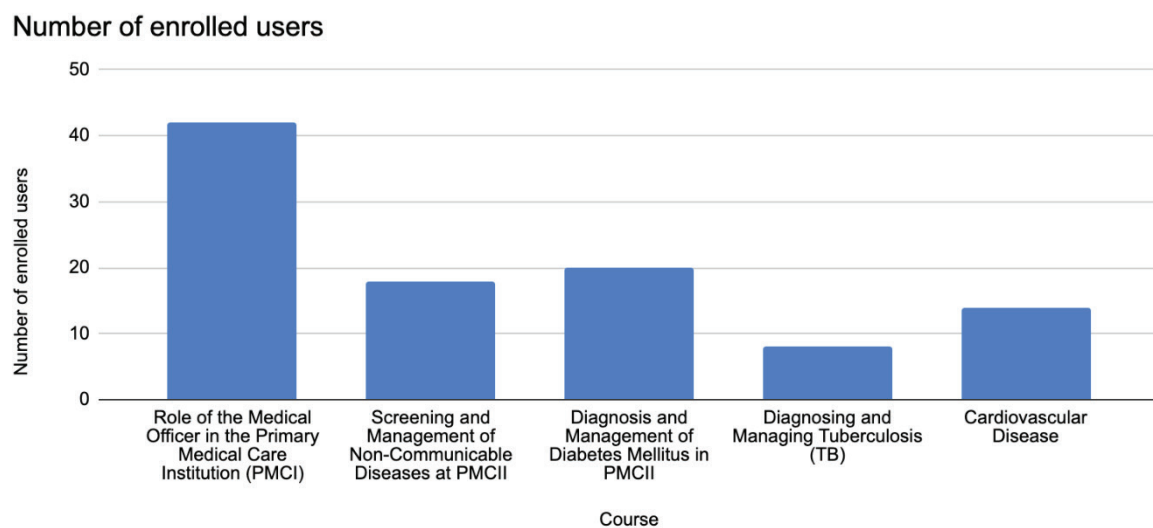


Figure 3: Number of enrolled users immediately following introduction