УДК 378.018.43:004.496

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РОЗРОБКА ВІРТУАЛЬНОГО НАВЧАЛЬНОГО СЕРЕДОВИЩА ДЛЯ КУРСІВ ІНФОРМАЦІЙНОГО МЕНЕДЖМЕНТУ НА РІВНІ БАКАЛАВРА НА ПРИКЛАДІ ЛАТВІЙСЬКОГО УНІВЕРСИТЕТУ

DEVELOPING A VIRTUAL LEARNING ENVIRONMENT FOR BACHELOR'S STUDIES IN INFORMATION MANAGEMENT THE CASE OF THE UNIVERSITY OF LATVIA

Описано віртуальне навчальне середовище, розроблене кафедрою бібліотекознавства та інформатики факультету соціальних наук Латвійського університету; проаналізовано отримані результати на основі курсів інформаційного менеджменту (рівень бакалавра), створених на базі платформи для віртуального середовища Moodle; застосовано метод контент-аналізу. Категорії контент-аналізу базуються на двох елементах фунціональності Moodle — управлінні курсами й управлінні навчанням.

***Ключові слова**: конструктивістська педагогіка, віртуальне навчальне середовище, управління курсами, управління навчанням.*

Описана виртуальная обучающая среда, разработанная кафедрой библиотековедения и информатики факультета социальных наук Латвийского университета; проанализированы полученные результаты на основе курсов информационного менеджмента (уровень бакалавра), созданных на базе платформы для виртуальной среды Moodle; применён метод контент-анализа. Категории контент-анализа основаны на двух элементах функциональности Moodle — управлении курсами и управлении обучением.

***Ключевые слова**: конструктивистская педагогика, виртуальная обучающая среда, управление курсами, управление обучением.*

The aim of this paper is to examine the development of the virtual learning environment at the Department of Information and Library Studies of the University of Latvia's Faculty of Social Sciences, also analysing the results that have been achieved therein. The analysis focuses on courses in the bachelor's degree programme «Information Management». These are organised on the basis of the Moodle virtual learning environment platform, the analysis method being content analysis. Categories for the content analysis were based on two elements of Moodle functionality — course management and learner management.

Key words*: Constructivist pedagogy, virtual learning environment, Moodle, course management, learner management*

Introduction

The rapid development of information and communications technologies in the world has had a substantial influence on educational processes. It has been stated that «education has changed tremendously over the past few decades, not least as a result of easier access to networked information and communication technologies. Common adjectives attributed to both education and educational institutions are: *flexible*, *inclusive*, *collaborative*, *authentic*, *relevant*, *global* and *effective*. [..] There is a noticeable move from instructivist to constructivist pedagogy.»[1] The constructivist point of view in the field of pedagogy emphasises the idea that learners are encouraged to construct their own knowledge instead of copying it from an authority, dealing with realistic situations and working together with others, as opposed to working on one's own.

A Virtual Learning Environment (VLE) has been devised to support the aforementioned thinking in the area of constructivist pedagogy. A VLE is defined as a «range of systems that comprise features like a designed information space, a social space being a 'place', and participants that are active»[2]. A VLE is seen as a virtual classroom which allows educators and learners to communicate with each other online. Class information, learning materials and assignments are characteristically provided via the E-course Website. Students can log onto the Website to view the information and then download assignments and required reading materials to their own computers. The VLE also enables students to complete assignments and tests online. The popularity of the VLE relates to its ability to enable learning-based communication without time and space constraints. This rising popularity means that the creation of well-developed and effective VLEs has become a top priority for educational institutions.

Over the past two decades, many higher education institutions have adopted a wide range of VLE tools into their educational delivery and support processes. Numerous studies have been conducted to assess the appropriateness of VLEs, discuss their applications and practices, and investigate their influence on contemporary education.[3]

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1 Uschi, F. "E-Learning Pedagogy in the Third Millennium: The Need for Combining Social and Cognitive Constructivist Approaches." *ReCALL*, Vol. 17, No. 1, May 2005 [cited 10 April 2013], pp. 85-100. See doi:10.1017/S0958344005000716.

2 Dillenbourg, P., Schneider, D. and P. Syteta. "Virtual Learning Environments". In Proceedings of the 3rd Hellenic Conference 'Information & Communication Technologies in Education'. Greece: Kastaniotis Editions (2002) [cited 10 April 2013], pp. 3-18. See http://hal.archives.-ouvertes.fr/hal-00190701.

3 See, e.g., Islam, S. Kunifuji, S., Hayama, T. and M. Miura. "E-Learning in LIS Education: An Analysis and Prediction", *Library Review*, Vol. 60, No. 7, 2011 [cited 10 April 2013], pp. 544-559. See Emerald Group Publishing Limited, 0024-2535. doi:10.1108/00242531111153579.

This study analyses the current situation with VLE development at the Department of Information and Library Studies (University of Latvia, Faculty of Social Sciences). Substantial progress has been made in this regard since 2002. More than 86% of academic staff at the department create and use E-courses in the learning process. The problem in this area characterises the results of these developments in the sense that although the *Moodle* course management system ensures a sufficiently broad array of functional capabilities, they are nonetheless not always used appropriately in the structure of E-courses, and the communication in the VLE does not support the constructivist learning process. The research questions for this study are as follows: 1) does the content of the VLE comply with the thinking of constructivist pedagogy?; 2) are the available *Moodle* capabilities (in two management capability groups — «Course Management» and «Learner Management») used in E-courses at the bachelor's degree level of information management studies? The level of VLE development is evaluated by engaging in content analysis in relation to the E-courses of «Information Management» study programme.

1. The process of VLE development at the Department of Information and Library Studies: An overview

Library and information studies in Latvia are offered by the Department of Information and Library Studies (DILS) of the University of Latvia's Faculty of Social Sciences. Prior to 2002, it was known as the Library Science and Information Department of the University of Latvia's Faculty of Philology. Both bachelor's and master's degree programmes are available. Development of the virtual learning environment began in the 1990s, when the Soros Foundation Latvia provided financing for the purchase of computers. The DILS was one of the first departments at the University of Latvia (LU) to install a computer classroom so that the first E-course, «Machine-Readable Cataloguing», could be offered to students. Latvia's libraries at that time were beginning to introduce the public library information system ALISE and to catalogue collections in an electronic format. That means that the relevant higher education institution had to allow students to learn about these processes. From today's perspective, this course was juts the first attempt to organise library studies in the electronic environment. It differed from today's understanding and organisation of virtual learning environments, because the process occurred on site, not in a distance learning way.

Rapid changes in the development of the virtual learning environment began in 2002, with the department changing accents in terms of the content of the study programme. It became part of the LU Faculty of

Social Sciences (FSS) and turned into the Department of Information and Library Studies. In 2002, the faculty members of the DILS were among the first at the university to develop modern E-courses in terms of content and functionality at the bachelor's, master's and professional study level. The FSS also organised motivational activities, and each instructor of an E-course received a portable computer. The first fundamentally new and restructured course was «Machine-Readable Cataloguing», and in 2003, instructor Baiba Mūze received an award in the LU's E-course competition for the course that she taught.

The first E-courses were dedicated to information and informatisation, because Latvia's unified library information system was being developed very rapidly. Along with the course on machine-readable cataloguing, students could take E-courses such as «Information Systems», «Electronic Information Searching», and «Classification, Subject Indexing and Co-ordinate Indexing.» The development of the library system in the information environment and the social phenomena of libraries were part of an E-course called «Library Philosophy».

After 2002, the development of E-courses occurred under the auspices of the «E-University» project, but the methodology and implementation of the courses were up to the individual courses and members of academic staff. DILS faculty members were familiar with virtual learning environment issues, and so E-courses were designed and organised without major problems even though this was a fairly extern process. The virtual learning environment at the LU was initially organised on the *WebCT* platform. The *Moodle* virtual study platform was only introduced in 2007.

When it comes to the beginning of the development of the DILS virtual learning environment, it can be said that a study platform was created that is necessary for the improvement of the professional competences, skills and abilities of students and faculty members alike, and that was a successful process. It demonstrated the professional and academic quality of instructors in the areas of library and information studies, also illustrating their interest in the development of the study process.

2. The developmental level of the virtual learning environment: An evaluation

2.1. The functionality of *Moodle*

The term «*Moodle*» refers to the «Modular Object-Oriented Dynamic Learning Environment.» *Moodle* is an Open Source Course Management System (CMS), also known as a Virtual Learning Environment. It has become popular among educators all around the world as a tool for the creation of online and dynamic Websites for their students.[1] Statistics

1 "What is *Moodle*?" [on-line]. *Moodle* Trust, 2007 [cited 10 April 2013]. See https://*Moodle*.org/about.

show that *Moodle* is being used by 1.2 million teachers in 232 countries, including the United States, Great Britain, Germany, Australia, Spain, Italy, etc.[1]

Moodle is a software package that was developed so as to help educators to create high-quality online courses and manage learner outcomes. The development of *Moodle* is guided by the philosophy of learning that is described with the concept of «constructivist pedagogy». According to this thinking, learning-related communications «focus on the experiences that would be best for learning from the learner's point of view, rather than just publishing and assessing the information they need to know. [..] The teacher's role can change from being the 'source of knowledge' to being an influencer and role model of class culture, connecting with students in a personal way that addresses their own learning needs, and moderating discussions and activities in a way that collectively leads students toward the learning goals of the class».[2]

To satisfy the aforementioned goals in the practice of constructivist pedagogy, *Moodle* offers a series of technical capabilities. The capabilities of two management groups — «Course Management» and «Learner Management» — were analysed so as to analyse the level of development of the VLE for information management studies at the bachelor's degree level.

In the group of technical capabilities related to «Course Management»[3] *Moodle* offers:

– *Side blocks* (upcoming events, the latest news, etc.). Side blocks are basic screen elements in the *Moodle* system. Side blocks can be added, removed or moved around on the course homepage to satisfy the lecturer's needs. Side blocks are linked to other technical capabilities such as the side block «Latest News» being linked to the side block «Forum.» Side blocks can be used to indicate communication activities.

– *Design* (text layout, headings, hyperlinks, insertion of illustrations and descriptions, etc.). Design is performed by using the inbuilt HTML editor. The *Moodle* HTML editor is not as feature-rich as commercial applications are, but it is possible to do almost anything that these tools can handle. A logical and intuitively comprehensible visual appearance helps students to perceive the course content.

1 *Moodle* statistics [on-line]. *Moodle* Trust, 2007 [cited 10 April 2013]. See https://*Moodle*.org.stats.

2 "Design Philosophy." In *Moodle* for teachers, trainers and administrators [on-line]. *Moodle* Trust, 2005 [cited 10 April 2013], p. 5. See http://download.*Moodle*.org/docs/en/*Moodle*_1.4.3._for_teachers_and_trainers.pdf.

3 "Course Management". In *Moodle* for teachers, trainers and administrators [on-line]. *Moodle* Trust, 2005 [cited 10 April 2013], p. 5. See http://download.*Moodle*.org/docs/en/*Moodle*_1.4.3._for_teachers_and_trainers.pdf.

– *Resources* (book, URL, label, embedded multimedia, etc.). These resources allow almost any kind of Web content to be inserted into the course. *Moodle* enables the embedding of rich media into an activity that is created within a course in which the HTML editor is used.

– *Activities* (assignment, quiz, database, glossary, questionnaire, workshop, etc.). Activities such as quizzes also make it possible to add interactive content to the course.

In the group of technical capabilities related to «Learner Management»[1] *Moodle* offers:

– *Assessment* (grades, comments, etc.). An assessment can be based on a participant's online submission of an electronic file or on an offline submission of the project in an actual classroom. The lecturer can provide the assessment, grade or written feedback that is related to the assignment.

– *Chat and forum.* The chat room allows participants to engage in a real-time and synchronous discussion on the Web. This is a useful way of ensuring a different understanding of other participants and of the topic that is being discussed. The forums can be most important in terms of helping students to construct new knowledge. It is here that discussions among learners and educators take place.

– *Wiki.* The *Moodle* wiki allows participants to work together on Web pages in terms of adding, expanding or changing the content. Older versions are never deleted and can be restored.

In analysing the functional capabilities of *Moodle* in both management groups (course management and learner management), one can conclude that the different information resources provided in e-course help to construct students' knowledge, and the most appropriate elements related to the principles of constructivist pedagogy are various activities (e.g., quiz, database, glossary), as well as assessment, chat and forum, and wiki. Particular attention was focused on these functional elements in the process of content analysis.

2.2. The methodology of E-course analysis

The empirical foundation for the research is made up of the functional capabilities of the *Moodle* virtual learning environment and the E-courses taught as part of the bachelor's degree programme «Information Management». Of 58 courses in this programme, 30 (52%)

1 "Learner Management". In *Moodle* for teachers, trainers and administrators [online]. *Moodle* Trust, 2005 [cited 10 April 2013], p. 5. See http://download.*Moodle*.org/docs/en/*Moodle*_1.4.3._for_teachers_and_trainers.pdf.

are E-courses, and of those, 27 are courses which focus on the library and information field study topics.

E-courses in the study process are mostly used at this time as a supplement to traditional teaching methods, offering students unlimited opportunities during the semester to access various study materials (lecture presentations, texts for reading, etc.) in accordance with the schedule of the course — examinations, quizzes, as well as evaluations of what has been achieved by students during classes and seminars. The E-courses are basically designed by instructors in the LU Department of Information and Library Studies, as well as colleagues from the LU Faculty of Social Sciences. Despite student desires, guest lectors have not been asked to prepare an E-form of their courses.

Content analysis of the functions of E-courses has been conducted so as to evaluate the level at which the courses ensure the implementation of the philosophy of constructivist pedagogy. The categories for the analysis are the same as the functionality categories of *Moodle* — «Course Management» and «Learner Management.» The analysis makes it possible for the authors to determine the extent to which each category is in line with one of three levels — a high level (active use of the E-course capabilities[1]), a medium level (a more or less active use of the capabilities[2]), or a low level (the capabilities are not utilised).

The authors have also identified indicators in these various categories which, as far as they are concerned, may support the ideas of social constructivism pedagogy. The «Course Management» category has the following indicators: *side blocks*, *design*, *resources*, *activities*. For the «Learning Management» category, the indicators are *assessment*, *chat and forum*, and *Web conference and wiki* (see Appendix 1).

In evaluating the *side blocks* indicator, the authors have focused attention on whether the E-course ensures navigation, settings, searches, the latest news, a calendar, expected events, and the most recent activities. These are all capabilities which allow students to control the situation in the course, seek out necessary materials and move around the courses in the semester. In evaluating the *design* indicator, the focus is on whether and how texts (materials) are structured and viewed (by week or by topic, whether there are captions, whether certain parts of the text are emphasised with colour, etc.). The *resources* indicator is evaluated by looking at the extent to what kind of materials and how many of them are available in the E-course (e.g., lecture presentations, files

1 Active use of E-courses means that more than 50% of the offered capabilities are utilised.

2 Use of 5-50% of the offered capabilities.

of articles, hyperlinks to Internet resources, embedded audio and video files). In terms of the *activities* indicator, the authors look at whether the E-course offers capabilities which allow students to carry out assignments, take tests, answer questionnaire questions, put together dictionaries and wikis, involve in seminars, chats and conferences, etc.

Evaluation of the *assessment* indicator in the «Learner Management» category is focused on whether the student has access to the evaluation of assignments and seminars that are part of the course, as well as to comments from the instructor. The indicators which are important in terms of the ideas of social constructivism (*chat and forum*, and *Web conference and wiki*) are evaluated on the basis of whether the relevant capabilities are or are not offered.

2.3. Implementation of functional capabilities in E-courses of «Information management» study programme

In analysing indicators from the «Course Management» category, it becomes evident that functionality capabilities are ensured at the medium level (54% of instances; Figure 1.1). The best use relates to course design (structuring and placement of texts, as well as use of captions and colours) (93% of instances are at a high level). More than one-half (60%) of the E-courses ensure the accessibility of various study resources at a high level, and that is a prerequisite for allowing students to engage in active studies on an independent basis while utilising a diversity of sources of information.

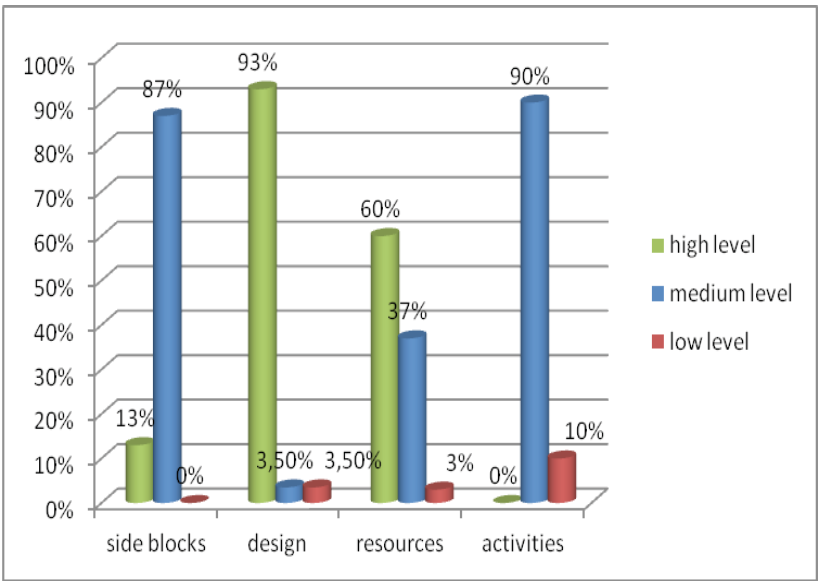

Figure 1.1. **An evaluation of indicators in the «Course Management» category (n=30; %)**

Capabilities to manage course materials and monitor the latest events are ensured at a medium level in most E-courses. Many instructors do not use the linkage capabilities (settings) of *side blocks* in Latvian, the calendar, the latest news and upcoming events. Several E-courses offer a schedule for the course in form of a PDF file, but this is not linked to interactive calendar. 90% of E-courses also offer just a few activities. Of the *Moodle* capabilities, the one that is used most often is the preparation of assignments and tests, with little or no use at all of dictionaries and wikis, questionnaires, chats, seminars, and organisation of online conferences.

Most (62%) of the indicators in the «Learner Management» category (*chat and forum* and *Web conference and wiki*) show that functionality is at a low level (Figure 1.2). This means that students do not have any active opportunity to exchange ideas and views about a topic under the auspices of E-courses. This may be because most E-courses are only a support function for traditional teaching in an auditorium, with discussions and exchanges of views occurring during seminars on site.

Nearly all (97%) of E-courses allow students to track the evaluation of their work. Of course, the utility of this function largely depends on the activities of the instructor in commenting on the work and in uploading grades or corrected assignments in a timely way. For a detailed chart of E-course analysis, please see Appendix 2.

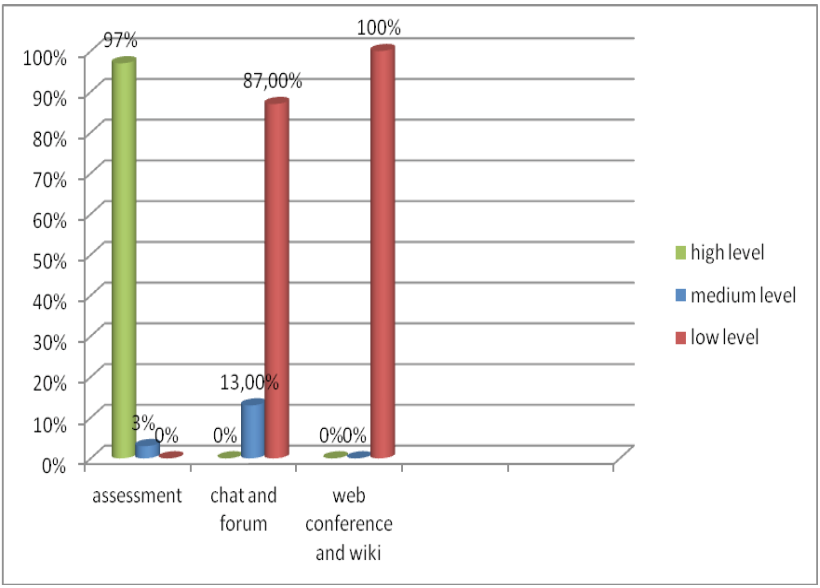

Figure 1.2. **An evaluation of indicators in the «Learner Management» category (n=30; %)**

An evaluation of indicators in the both categories (course management and learner management) reveals that functionality of VLE is used partially: E-courses provide resources for studies, but they don't support involvement of students in the study process.

Conclusions

Analysis of E-courses in the bachelor's study programme related to information management has been conducted with the goal of evaluating the level of development in the virtual learning environment at the Department of Information and Library Studies. Improvements to information and communications technologies over the past 20 years have allowed the principles of constructivism to be enshrined in the field of pedagogy. This speaks to the activities of students in shaping knowledge and taking part in real situations and co-operation groups. The virtual learning environment has good prerequisites for supporting such principles. The *Moodle* virtual learning environment platform which is used to organise all DILS E-courses was designed in accordance with the philosophy of constructivist pedagogy.

Content analysis of E-courses makes it possible to draw conclusions about two categories in the functionality of *Moodle* — «Course Management» and «Learner Management»:

1. In the category «Course Management», functionalities are ensured at an average level (54%). Positive elements in this include the design of E-courses and the sufficient provision of various study resources. Various *Moodle* activities which ensure interactivity in courses and possibility for students to be more involved in studies are used fairly seldom.

2. Most (62%) of the indicators in the «Learner Management» category are at a low level, which these technological capabilities being utilised little or not at all. The only one of *Moodle*'s technical capabilities in this category that is used to a sufficient degree is the grading of student work. The most essential problem is the lack of co-operation capabilities (chat, forum, wiki) in E-courses, because these are the specific activities which underpin group work and exchanges of thoughts.

All in all, it has to be said that after a comparatively long period of development, the virtual learning environment is still being used for as a supplement for face-to-face lectures, not as an interactive communications environment. E-courses partly support ideas of constructivist pedagogy. They provide possibilities for students to develop their knowledge independently (60% courses have different resources for individual studies), but they don't encourage communication and exchange of ideas and active participation. Therefore the e-courses are appropriate as support tool for traditional learning form with regular meetings and discussions in classes, but they should be improved for distance learning form of studies.

Appendix 1. **E-course evaluation matrix**

Nr.	Course title	Course Management												Learner Management								
		side blocks			design			resources			activities			assessment			chat and forum			web conference and wiki		
		H	M	L	H	M	L	H	M	L	H	M	L	H	M	L	H	M	L	H	M	L

Evaluation levels:
H — high level (active use, more than 50% of the available capabilities)
M — medium level (moderate use, 5-50% of the available capabilities)
L — low level (no use of the available capabilities)

Appendix 2. E-course evaluation chart

Course title	Course Management												Learner Management								
	side blocks			design			resources			activities			assessment			chat and forum			web conference and wiki		
	H	M	L	H	M	L	H	M	L	H	M	L	H	M	L	H	M	L	H	M	L
Information sources and seeking		X		X				X			X		X					X			X
Organisation of knowledge		X		X			X				X		X					X			X
Organisation of information	X			X			X				X		X					X			X
Basics of Information Society		X		X				X			X		X					X			X
Introduction to information science		X		X			X				X		X					X			X
Basics of Web page design	X			X			X				X		X					X			X
The information infrastructure and institutions		X		X			X				X		X				X				X
Information systems	X			X			X				X		X					X			X
Information literacy		X		X				X			X		X					X			X
Information services		X		X				X			X		X					X			X
Course paper		X		X				X			X		X					X			X
Research in information science		X		X			X				X		X					X			X
Introduction to studies and research		X		X			X				X		X				X				X

Digital libraries and repositories		X		X			X				X		X					X			X
Quantitative and qualitative research methods	X			X			X				X		X				X				X
Information and knowledge management in organizations		X		X			X				X		X					X			X
Basics of database design		X		X			X				X		X					X			X
Introduction to bibliography studies		X		X				X			X		X					X			X
Normative background of information work		X		X				X				X	X					X			X
Information services for specific user groups		X		X				X				X	X					X			X
Information services and centres		X		X				X			X		X					X			X
Information resources in social sciences and humanities		X		X			X				X		X					X			X
Information resources in natural and applied sciences		X		X				X			X		X					X			X
User groups — children and adolescents		X		X			X				X		X					X			X
Management of collections		X		X			X				X		X				X				X
Local studies at libraries		X		X			X				X							X			X

Electronic publishing		X		X			X				X		X					X			X
SPSS in social sciences		X		X			X				X							X			X
Academic internship (information management at libraries)		X				X			X			X	X					X			X
Basic Problems of Modern Democracy		X			X			X			X			X				X			X