# A Student-Driven Approach to Teaching E-commerce

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## ABSTRACT

This paper describes an approach to teaching e-commerce at a masters level in a course that is entirely coursework assessed. The approach involves students giving weekly presentations of material they have researched based on fairly detailed subject guidance provided by the lecturer. The approach uses extreme programming as an analogy for the structuring of the content and the process through which learning takes place. The way in which subject material is presented to the students, and the learning cycle which takes place are described. Students develop presentation material in response to stories, which set the context and problems, and tasks which set the detailed areas for investigation. These presentations are done for peers and the tutor and are immediately commented on, leading to the revision of presentation material to appear in an assessed portfolio. The e-commerce syllabus is presented in the context of a commercial or government organization seeking to develop and implement an e-commerce strategy. The agile approach leads to the discovery of new ideas and frameworks by students, and to the development of skills in critically analyzing e-commerce concepts from industrial and academic sources. The paper discusses the student's role as an active developer and deliverer of material in a group environment and the role of the tutor in directing studies, providing support and counsel and assessing student deliverables. In interviews, students commented that the approach was challenging and somewhat daunting, but was a rewarding learning experience. Preconceptions as to what e-commerce involved were challenged through the student-driven research done for the presentations.

**Keywords:** E-Commerce Teaching, Agile Approach, Extreme Programming, Reflective Cycle of Learning

## 1. INTRODUCTION

The teaching of e-commerce and the underlying systems and technology is a challenging undertaking, not least due to the volatility of the subject area. Changes in business application and even the technology occur rapidly. Any survey of e-commerce applications will indicate that e-commerce changes sufficiently rapidly to require yearly revision of textbooks such as Turban et al (2005). The crash of the dot.com market (Howcroft, 2001) undermined some of the foundational premises on which e-commerce was taught. New concepts and e-commerce models which in one instance seemed sound and worthy of communication to students subsequently disintegrate and for all practical purposes disappear from the business environment. The concept of application service providers (ASPs), for example, which was predicted to create a $22 billion market by 2003, rapidly faded out as the nascent companies went out of business (Currie et al, 2004).

In addition to the volatility of the subject area, the paucity of theoretical foundations and long-lasting frameworks can reduce courses to a catalogue of current applications and interesting case studies of e-commerce successes which may not reflect the overall situation in the market and may be simplifications that lack depth in describing content or process. E-commerce courses may then provide superficial knowledge which does not equip students with the conceptual frameworks and critical skills to deal with changing technology and business opportunities.

This situation can be frustrating for the tutor who is developing material with short delivery timescales which may end up being superficial and reflecting short term fashions and untried technology. The planning and production of well-designed, robust course materials takes time, analogous to the time taken to develop a large information system. Constant re-writing of material places a burden on the teaching which detracts from developing delivery approaches, teaching the material and carrying out assessment.

Long course development timescales may not be practical for volatile courses in e-commerce and an alternative model which allows fast delivery is required. Such a model may be derived from agile methods in systems development which

endeavor to provide quickly-developed systems which can be implemented in a short scale and respond to rapid environmental change.

These difficulties in delivering an e-commerce course may be compounded if the classes are small, as is often the case in MSc offerings in the UK. Lecturing styles which feed information to students in packages presented from the front of the class by the tutor may be inadequate for advanced students working in small groups. The lack of student involvement which is a property of lecture-based delivery does not encourage student learning. Lectures may be singularly inappropriate for teaching a volatile subject such as e-commerce. Student participation may require at the least case studies which are critically analyzed. Optimally, the students should be actively researching the area, critically appraising latest frameworks and technology, and learning by sharing their discoveries with their peers in a classroom situation.

Such a combination of small classes and volatile, ill-defined material calls for a different approach to teaching which is flexible while still establishing some foundations for arranging the material and organizing the learning experience. By analogy with information systems development a shift from formal teaching methods to rapid teaching methods requires an equivalent change in teaching approach as is seen in the shift from waterfall lifecycle development methods to agile development methods.

This paper describes an agile approach to teaching information systems subjects, applied to an e-commerce course, E-Commerce and Virtual Organizations (ECVO), on a MSc. The model for the approach is derived from extreme programming. The paper discusses the role of the student and teacher in delivering the course, describes the syllabus and the transformation of the syllabus into guidance for student delivery, and reflects on the outcome of delivering the course for three years.

## 2. THE E-COMMERCE AND VIRTUAL ORGANIZATIONS COURSE

The course runs over twelve weeks. Students are issued with a handbook which describes the course philosophy and conduct and splits the syllabus into ten sections. In each section the student is presented with a number of stories, with a list of tasks accompanying each story. The stories set the scene by describing a problem or case study. The tasks indicate what information and study is required to satisfy the needs of the story. Students are split into tutorial groups of four to six. Each week the students divide up the stories between them; each student tackling one story. If there are more students than stories, the group, in consultation with the tutor, will decide which stories to drop. If there are less stories than group members, students share a story and agree how to split up the tasks between them. Each student then uses some or all of the tasks as a basis for developing a 15-20 minute MS-PowerPoint presentation.

The first week is introductory. The tutor explains the course philosophy and conduct, establishes groups and timetables, and outlines the first set of stories. Students then have a week to prepare their presentations. Teaching time is split into separate tutorial sessions for each group of an hour to an hour and a half. In each tutorial session students take turns to present their material in a conference or seminar environment. Students listen to each other's presentations, take notes and ask questions. The tutor clarifies issues and makes suggestions for improvement. The presenting student takes notes during the questioning and consultation that will enable her to revise and improve the presentation before incorporating it into her course portfolio. At the end of each tutorial the tutor explains and clarifies the next set of stories for the subsequent week's presentations. The tutor may make suggestions as to where to start in researching the tasks and may suggest key references or sources as a starting point. Students are encouraged to search the Internet for sources and to draw sources from academic journals as well as using textbooks where relevant. They are also encouraged to examine sources critically and to roam widely in their search for relevant information to fulfill the tasks.

Figure 1 illustrates the learning process in the course in which cycles of reflection occurs, developing the students understanding of the course subjects and their critical and research skills. While the principal cycle of reflection depends on tutor feedback on student presentation, other cycles of reflection are evident in the learning process. Students are required to reflect on their selection of stories and tasks, their selection of sources to support the tasks and their synthesis and presentation of material.

The prime assessment vehicle is the course portfolio which consists of the ten presentations, with explanatory notes. These presentations should exhibit signs of revision in the light of comments from both the tutor and students during presentation. Hence the presentation is a key element in the learning process. An additional element of assessment involves the developing of a case study using a real organization in which concepts from the course are applied to develop e-commerce ideas for the organization and advice on their implementation.

## 3. EXTREME PROGRAMMING AS A MODEL

Extreme programming arose partly from a need to deliver working software systems quickly to meet immediate needs in a volatile environment. It focuses on early and continuous delivery of valuable software. It relies on face-to-face communication of requirements and strives for daily delivering of software. Extreme programmers welcome change and work without software specifications and without separate design and testing stages. The inventors of extreme programming espouse four values which may be of relevance in teaching e-commerce.

The first value in extreme programming is good communication. The working environment is set up to
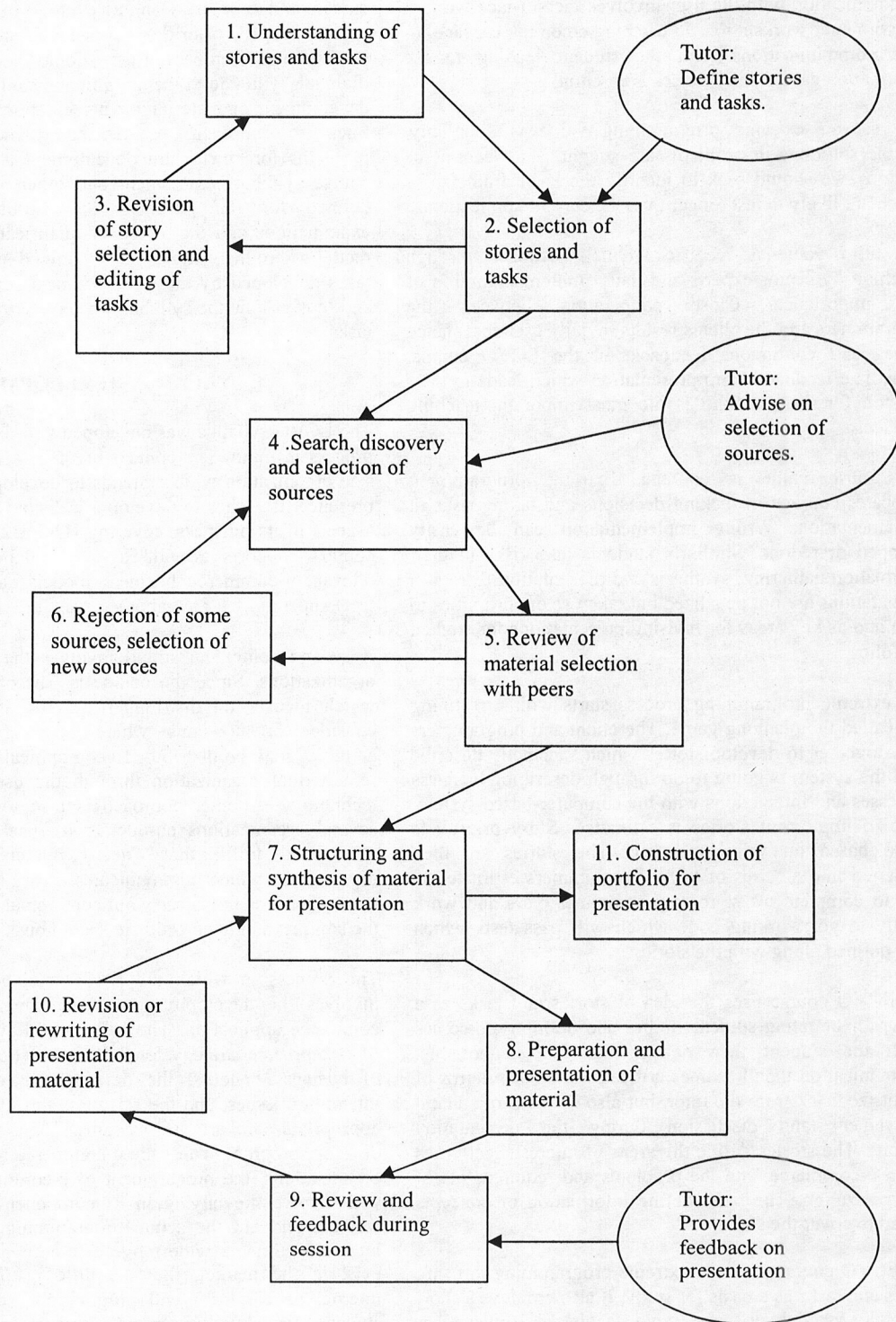
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                    ┌─────────────────┐                    ╭──────────────╮
                    │ 1. Understanding│                    │ Tutor:       │
                    │ of stories and  │                    │ Define       │
                    │ tasks           │                    │ stories      │
                    └─────────────────┘                    │ and tasks.   │
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   ┌──────────────┐        ┌─────────────────┐
   │ 3. Revision  │        │ 2. Selection of │
   │ of story     │◄───────│ stories and     │
   │ selection and│        │ tasks           │
   │ editing of   │        └─────────────────┘
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                         │ selection of      │             ╰──────────────╯
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   │ 6. Rejection of  │       │ 5. Review of    │
   │ some sources,    │◄──────│ material        │
   │ selection of new │       │ selection with  │
   │ sources          │       │ peers           │
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        ┌──────────────────┐       ┌──────────────────┐
        │ 7. Structuring   │       │ 11. Construction │
        │ and synthesis of │──────►│ of portfolio for │
        │ material for     │       │ presentation     │
        │ presentation     │       └──────────────────┘
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   │ 10. Revision or  │             ┌──────────────────┐
   │ rewriting of     │             │ 8. Preparation   │
   │ presentation     │             │ and presentation │
   │ material         │             │ of material      │
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        │ 9. Review and    │        │ Tutor:       │
        │ feedback during  │◄───────│ Provides     │
        │ session          │        │ feedback on  │
        └──────────────────┘        │ presentation │
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**Figure 1: Student-Centred Cycles of Learning**

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Encourage communication. Programmers work in pairs and communication with the user involves face-to-face work at the computer workstation. In teaching e-commerce, face-to-face communications with the student leading to the information gathering exercises is essential.

The second extreme programming value is simplicity. Simple solutions to problems are sought. In e-commerce teaching we should seek to identify the basic frameworks which are likely to last longer than the current applications.

The third value is feedback. Quick feedback through coaching by senior experts and daily implementation is of key importance. Close cooperation between the programmers and the clients results in daily user acceptance testing and continuous feedback. In the ECVO course, immediate feedback from presentation which leads to their revision for the portfolio is the most important teaching practice.

The fourth value is courage. Extreme programming advocates courage in making decisions and taking risks in implementation. Wrong implementation can be easily scrapped or redone. Similarly students take risks in their information gathering, synthesis and presentation. Errors in presentations are not penalized but taken as opportunities to learn and as key areas for revising presentations for student portfolios.

The extreme programming process starts with a planning step called the planning game. The client and programmers work together to develop stories which succinctly describe what the system is going to do through describing business processes and interactions with the computer-based system. Time to implement stories is estimated. Story priority is sorted based on value and risk. The stories are then converted into a series of tasks. Programmers estimate the time to complete tasks, form programmer pairs and work rapidly to get working code which will pass tests which were defined along with the stories.

The ECVO course uses the idea of stories and tasks as a means for targeting student studies and defining outcomes which the student then delivers as fast as possible. Communication then becomes critical, not only in terms of instant feedback from the tutor, but also in terms of student involvement and discussion during the presentation sessions. The stories define the areas of interests, activities within e-commerce, and the problems and requirements of an organization. The tasks define information or concepts needed to cover the stories.

The ECVO course parallels extreme programming in using stories and tasks as a basis for study. It also employs a short timescale for delivery and rapid feedback. However, it diverges from the principle of extreme programming in that the stories and tasks are predefined by the tutor and presented in a handbook. Ideally an e-commerce course modeled on extreme programming should start with a clean state. The tutor should present the philosophy and ground rules for the course then initial sessions should involve the student and tutor in a planning exercise in which the subject area is scoped, priorities defined and stories written in a workshop environment. Tasks should then be developed in dialogue with the students which would then lead to the development of material for presentations by the students. Such an approach, besides being more risky, poses problems for curriculum development activities in which course syllabus, assessment and other activities must be defined for the purposes of institutional validation, examinations and the award of qualifications. Based on a model where the syllabus is pre-defined and the stories and tasks developed by the tutor, we next review the syllabus and look at how the syllabus was converted into stories and tasks.

## 4. SYLLABUS DEVELOPMENT

The ECVO syllabus was developed with both a context and process in mind. The context involves a medium to large-size organization which intends to develop an e-commerce presence. It wishes to develop a website which supports all aspects of its business, covering B2C, B2B and B2E. This context supports a wide-ranging syllabus in which all relevant e-commerce business models can be considered (see Appendix 1 for syllabus).

A second contextual strand involves the study of virtual organizations. Since the course is part of an MSc degree which focuses on distributed systems, it fits in well to consider organizations where business functions and activities may be distributed geographically and are united in a virtual organization through the use of information technology. Another approach is also to consider where several organizations co-operate to meet the needs of a client and fulfill those needs by creating a virtual organization which communicates across the web using e-commerce systems to carry out contractual work, to manage the contract and to co-ordinate shared business functions.

The process in which the EVCO syllabus is embedded involves the development and implementation of an e-commerce application. The syllabus follows the definition of e-commerce strategy for the organization, the definition of business benefits, the development of requirements, integration issues, and the selection and implementation of appropriate software and systems. There is no attempt to develop, program or test the e-commerce system. For most organizations, the procurement of e-commerce application will involve the buying in of components, software and services and not the actual programming of any systems internally. Since a wide range of e-commerce components exist in the market, there is little justification for any internal development and programming effort. For most students, their involvement with e-commerce is most likely to be in requirements definition, procurement, contract management and service support. The programming side of e-commerce is tackled in another module within the MSc. One purpose of the ECVO syllabus is to counteract the overemphasis on the technical and programming side of e-

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commerce which is a feature of many e-commerce courses within information systems, computing and computer science departments.

In this course there is a strong emphasis on the links between the business strategy and benefits, the requirements and the implementation and support of the e-commerce system. It is made very clear that the e-commerce system exists within the organization to meet a business need and to deliver business benefit and return on investment. It is not implemented to demonstrate the technology or to pursue technological prowess.

The following learning objectives were set for the course. The student will be able to:
1. Critically analyze organizational, information and IT infrastructure.
2. Produce an e-commerce business model and supporting business case for e-commerce application implementation.
3. Define requirements for an e-commerce application.
4. Map requirements to available packages and services and critically evaluate potential systems

These objectives cover the strategy, requirements, implementation lifecycle and place significant emphasis on understanding infrastructures. At various points in the course layers of infrastructure are considered. The organizational infrastructure is considered early on. The underlying technical infrastructure of web-based applications is explored to provide a technical – business balance. The information infrastructure of both traditional and virtual organizations is explored through the development of an understanding of information flows. A further level of infrastructure is the application infrastructure which involves considering how the various e-commerce application components fit together. All these levels of infrastructure provide the opportunity for the student to use diagrams, investigate real examples in industry from their experience or from case studies on the Internet and to develop communication skills through explaining the infrastructure in their presentations.

### 5. DEVELOPING STORIES AND TASKS

The syllabus was converted into a series of stories which set the scene and cover the syllabus. Some stories set the scene for an academic concept. For example, one story raises the issue of culture. It provides some definitions of culture and suggests that culture will have a significant effect on the way e-commerce systems are tackled. The story paints a broad brush picture of the area. Tasks are then defined which give detailed and concrete information and study requirements. For the culture story, tasks require definitions of culture, evidence that culture affects organizational structures, illustrations of different company cultures and evidence of organizational culture affecting e-commerce usage.

Table 1 illustrates a typical story and associated tasks. Here the story is used to set the concept of an e-commerce

business model and its characteristics within the context of an organizational requirement for an e-commerce strategy which uses an e-commerce business model. The tasks take the student through an academic analysis of e-business model, through to the evaluation of the models for an organization.

The relationship of the story with the tasks is one of painting a high level conceptual picture of the area of study or the problem and the implementation and knowledge requirement details. In some stories, the best way to paint the high level picture is through defining a case study around an organization with a specific e-commerce need. Case studies include a global organization contracting to build a global accounting system, a small printer requiring an e-commerce application and a requirement to provide a web-based system providing 24x7 customer service support for a major retailing client.

The course handbook splits the syllabus into ten sessions, defining two to six stories and their related tasks for each session. There is a balance of case studies and factual tasks. The tasks are carefully written to ensure that the student needs to employ critical thinking and creativity to fulfill the tasks. Students are encouraged to reflect on the sources and material they find and present their own insights and ideas.

It would easily be possible to add new stories around different technology and business situations, different viewpoints or student concerns. Hence students should be encouraged as part of the negotiation process to suggest other areas of study and key subject areas.

### 6. THE STUDENT'S ROLE

In ECVO the student is the developer and deliverer of subject material under the tutor's guidance. This involves developing and presenting material based on the tasks associated with a particular story. The student must understand the questions; have some idea of where to pursue relevant material; arrange, edit and synthesize material in a coherent way; present the material in a workshop environment; answer questions about the material; reflect on concepts discussed in the presentation sessions; and critically revise their work to form the final portfolio. Such a range of activities develops skills in researching, presentation, listening and revising in addition to the knowledge an understanding of e-commerce that is developed.

Developing and presenting material on a weekly basis in a ten week course is a demanding task which helps develop time management skills. Resources are drawn from web-sites, journals and textbooks. Students may start with a textbook such as Turban et al, 2005) as a starting point for understanding the basic concepts. The student needs to develop a critical eye and the ability to focus in on a few key references and sources which will support the tasks. The student must neither do a superficial job in researching the tasks nor get so bogged down in pursuing references

| Story | The development of e-commerce within an organization must start with the creation of a business model which demonstrates how the business could exploit e-commerce, what activities would reasonably fit the goals and mission of the business and how these activities relate to the business. Such a business model must be understandable by senior managers who may have little understanding of the commercial potential or technology associated with ecommerce. The organization requires that an e-commerce strategy is presented which uses an appropriate model to define the e-commerce involvement of the organization. This model should demonstrate the linkage between the business goals, mission and activities and the proposed e-commerce operations. |
|---|---|
| Tasks | Investigate what e-commerce strategy models are available in the literature (academic and industrial). |
| | Produce a classification of these models, identifying types of models, purpose of models and contents of models. |
| | Develop an understanding of the relationship between the business strategy, e-commerce strategy and IT strategy. |
| | Based on an analysis of some available frameworks, provide some guidance on how a business can decide on its depth of e-commerce involvement. |
| | Produce a final e-commerce strategy model which will provide the basis for developing an e-commerce strategy for your selected organization. |

**Table 1. An Example Story and Associated Tasks**

that the presentation is put together in a rushed manner. A disciplined, time-boxing approach to the course needs to be developed. Students tend to find the course so interesting that they spend too much time on it to the detriment of other strands of the MSc.

In writing the material, students often reflect on the relationship of the material to their current business involvement, which may be significant if they are part-time students in jobs related to e-commerce. This not only grounds the studies in the student's current understanding but also makes for an extra layer of interest for both the students and the tutor.

The students also need to develop the skills concerned with working in teams. Since students form teams, team work is required in dividing up the material. Although students work individually on their tasks and stories and present individually within a team session, in good teams the students support each other by shedding light on other team members' tasks outside the presentation session and during presentation. A student researching her task may find a source relevant to another student's tasks and share that with her. Students often talk through their presentations which each other before the presentation session. During the session, students ask each other supportive questions, help each other with questions and use the detailed knowledge they acquire of their own tasks to enlighten other students' tasks and to identify links and commonality. Such activities are a key ingredient of the learning experience.

In order to gain a rounded learning experience, each student is expected to listen to the other students presentations, to take notes and to ask questions. In a team atmosphere, significant learning will take place as a result of students interacting with other students' presentations.

## 7. THE TUTOR'S ROLE

The tutor is director of studies, high priest of the subject area (McBride and Hackney, 2003), counselor, mentor, reviewer and assessor rolled into one. The tutor may write the stories and tasks or use the ones provided in the course handbook. Either way, the tutor must have intimate knowledge of the subject area. The tutor will have to guide the students' research, critically evaluate the material presented, fill in missing material and direct students to references and sources that will enable them to produce a complete, comprehensive and rounded product for the portfolio; mediate student discussions during the presentations and fill in any gaps between presentations to assure that the entire subject area as defined in the syllabus is addressed. Filling in gaps will primarily involve pointing out the unifying conceptual links between presentations. This requires deep knowledge on the tutor's part as the tutor is acting as the expert consultant.

The tutor is not only supporting the learning of the e-commerce and virtual organizations subject area, but is also tutoring at the meta-level in teaching the students a variety of research skills. Students coming to this course often have little experience of the research process, of how to search literature and produce a literature review and of how to present material. The tutor will provide guidance on what Internet and journal sources may be relevant. She will teach how to search a journal, examine titles and abstracts for relevancy and read the text of a paper in an efficient way in order to extract key concepts of relevance to the presentation. She will encourage and teach a critical approach to Internet sources. How authorative is the source? How does it relate to commercial interests? How do we assess the value of a web site as a source of real life case study material, a source of key concepts, or a survey of current coverage of e-commerce, for example? Presentation skills in using MS-PowerPoint slides, developing good

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presentations and physical presentation style will also be developed in the natural course of the presentation sessions.

The critical review which occurs on-the-spot during the presentations is a key element of the learning process and the reflective cycle. Students may or may not be interrupted during their presentations according to their preference. But at the end of the presentation, students ask questions and then the tutor comments on the presentation. This immediate feedback encourages critical reflection about the material. It will involve commenting on new avenues the student could explore; corrections to be made to material which is wrong, additional slides which may be needed for completeness, clarifications required, and elaboration where the material is too terse and explanations are missing. The students will revise their presentations and extend notes accompanying presentations as a result of this instant tutor feedback. Instant feedback improved learning and the results of this critical reflection could be observed in the final portfolio.

This process makes for hard work for the tutor who must listen hard to the whole presentation. Such listening is a key skill the tutor must develop in order to effectively interpret student work and advise on portfolio improvements. However, the tutor needs to be careful to limit the amount of advice on improvement and identify key improvements needed since most people find up to three major suggestions enough to deal with (Knight, 2002). The tutor is also making a judgment as to whether the material and presentation is up to Masters Degree standard. If the student has taken short cuts, is too brief or superficial and hence not presenting to masters standard the student is challenged immediately and a complete revision or re-write will be required, the results of which will be seen in the portfolio. Re-presentations are not expected, but a greatly improved standard of presentation is expected in subsequent sessions and usually delivered.

Part of the tutor's task during the presentation is to make a judgment as to the student's understanding the presented subject matter and to extend the student's understanding. Any uncritical presentation of material from the web, which the student regurgitates without understanding, must be highlighted. The tutor should encourage the students to be interpreters and reviewers of the material they have gathered to fulfill the tasks.

The tutor will require around 20 minutes per student each week to listen to the presentation, ask questions and review the slides. Tutorial should contain 5-6 students. Where groups are larger, different approaches may be needed. Student groups could present concurrently, grouped round PCs, and the tutor may then tour around groups. Alternatively, students could be randomly selected to speak such that not every student speaks every week. Another approach could involve a goldfish bowl technique where students in an inner circle take turns to present extracts of their talks, watched by more students in an outer circle.

The assessment role will involve marking the portfolio with sensitivity to what changes have been made and to what extent the student has entered the reflective process, as well a marking the case study work with attention to how the course, or particular areas of the course, have been applied to a real-world situation.

## 8. EVALUATION

The small group situation, in which students present their own material, is both flexible, allowing for change in material and emphasis, and conducive to active learning (Race and Brown, 1998). Students prefer a constructivist approach in which they are active builders of understanding and are involved in knowledge transformation and creation (Kitchen, 2004). A student-driven approach, as described in this paper, gives the students the confidence to learn on their own. While lecture-free approaches have been used in information systems, particularly in systems analysis and development (Griffiths and Oates, 2003), the application of an agile approach is novel.

Students found the course challenging and interesting, although it was seen as a hard course involving a lot of work. Through carrying out their own research and doing presentations a sense of ownership of the material was achieved which resulted in some deep learning. However, the amount of work required by the student to deliver a talk a week over ten weeks was perceived as daunting and proved too much for some students who dropped out early on. In the first year of offering, the course was mandatory. Expansion of the course offerings in the second year allowed for students to change to a more traditional course in database management as an alternative to ECVO. In the second year, one student switched for health reasons, having expressed an interest in pursuing the entire course. Interestingly, another student dropped out because of a perception that he could not live up to the requirements of the course, despite encouragement from the tutor and fellow team members.

Students tended to do better in this course than in others in the MSc. This may be because their commitment to this course was greater since it was their responsibility to deliver material. However, in subsequent years where the course was optional, the more able students tended to select it. Less able students may have seen the course as being too demanding.

The cycle of refection encouraged by instant feedback during presentations led to the development of critical analysis and research skills and, for many students, a steady improvement in presentation quality over the ten weeks. Lack of critical selection of sources, superficial treatment of material and insufficient use of the academic journal literature was counteracted by tutor feedback. Students needed significant support and guidance to gain proficiency in handling academic sources.

There was significant value in working in teams. Some teams took on their own particular characteristics as students shared understanding and encouraged each other. Students provided each other with support which may have reduced the drop out rate. Student discussion of presentations, while sometimes needing to be encouraged by the tutor, occurred throughout all sessions and provided an additional source of feedback above and beyond the tutor's feedback. Reflection and rewriting of the material added to the learning experience and was reflected in marks which were, on average, higher than those of other courses within the MSc.

Tutor involvement is critical to the success of such a teaching approach. Feedback, as well as directing studies and acting as the user who defines what the stories are and enters into negotiation as to which tasks should be delivered are all essential parts of the tutor's role. The tutor does not have the traditional role of disseminator of information through lectures.

## 9. CONCLUSIONS

The dynamic nature of the e-commerce subject area requires teaching and learning approaches which can adapt to changing theory and practice. The development of material based on concepts and themes defined in stories and tasks enables the ECVO course to reflect current trends and concepts in e-commerce, and to explore present commercial usage. The agile approach leads to the discovery of new ideas that are presented by the students.

Students have developed themes and materials around: assessing organizational readiness for e-commerce adoption; the relationship between organizational structure and e-commerce implementation; the role of ASPs; mapping information flows in e-commerce; surveying e-commerce standards and technical links between SQL and XML.
In addition, students develop and present a wide variety of case studies to illustrate technologies and concepts. This makes for an interesting module whose themes and material are more wide-ranging than a traditional e-commerce course.

Students perceived the course as being difficult but worthwhile. As they develop material, their ownership of it results in deeper learning. Students acknowledge that the course has enabled them to develop a broad knowledge base well beyond that acquired from a lecture-based course.

The academic foundations and coherence are provided through the interpretation of stories and tasks by the tutor and the tutor directing students towards particular ideas and sources both before presentations and during the immediate feedback session. This tutor direction is of key importance to successful learning in what is a complex and exciting area.

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## APPENDIX 1: E-COMMERCE AND VIRTUAL ORGANISATIONS SYLLABUS

**Part 1: Infrastructure**
Organizational infrastructure. Internal infrastructure. Departments and grouping. Organizational culture. Evolution of organizational infrastructure. Classification of infrastructures. Intra-organizational infrastructure. Supplier chains. Development and evolution of outsourcing. Definition of virtual organisat6ions. (VOs) Types of VOs. Evidence for VOs. Development of VOs as an effect of outsourcing. Will we know a VO when we see it? Pragmatic VO business models.

Information flows. Identifying and mapping information flows inter- and intra-organizationally, Mapping information flows to organizational structure. Effect of organizational culture on information flows. Defects and errors with information flows.

Integrating organizations, information and IT infrastructure, Technological catalysts for organizational change. Roles of internet, intranet and extranet in the organization. Effect of e-mail on organizational culture and information flows. Effect of Internet technology, including XML, on organizational processes, workflow and culture.

Organizational IT infrastructure. E-commerce IT structures. Client / Server. Active page technology. XML. Distributed databases. EDI and Internet EDI. IT infrastructure links between organizations. Classifying and exploring IT infrastructure. Data Communication structures. Standards and developing standards.

**Part 2: Business Models and Benefits.**
Anatomy of a e-commerce application. How the application works in practice. Role of application in business; fit of application to business strategy. Comparison of e-commerce application with existing business channels. Benefits of application - tangible and intangible.

Significance of Internet-based solutions to fulfillment, procurement, supply chain management, marketing, sales-force management. Customer-relationship management. Analysis of business opportunities. Examples from business organizations and the health service.

Strategic business models for e-commerce. Examples of models. Classification and evaluation of models. Use of models in developing an e-commerce strategy. E-service strategy. Definition of e-services. Supporting e-services with a virtual organization. Designing an integrated e-commerce strategy. Integrating e-commerce strategy with business strategy.

Strategies for outsourcing e-commerce application and services. Benefits analysis and management. Identifying measurable benefits. Justifying intangibles. Surveying stakeholder benefits. Developing and presenting a business case. Tracking the benefits.

**Part 3: Design and Development of E-commerce applications.**
Overview of E-commerce, Intranet and Internet-based system design approaches. Roles of rapid application development. Component and packaged based approaches. Requirements definition. Storyboarding and web scenario planning. Identifying data requirements. Definition of object model. Identifying new system requirements. Design of stakeholder views. Use cases for E-commerce application development.

Design of navigation. Security and access structures. Navigational links. Page design. Logical data schema. User Interface Design. Identification of data sources and integration requirements with existing systems. Distributed design. Splitting design between participants in the virtual organization. Identifying core competencies and contribution to the e-commerce application. Defining standards and exploring integration issues with the virtual organization.

**Part 4: Implementation and Evaluation.**
Make or buy. Frameworks for deciding which element of the e-commerce application will be in-sources, which will be derived from components, which will be provided as off-the-shelf packages and which will be outsourced to application service providers.

Strategies for evaluating packages and service providers. Defining products and performance through service level agreements. Frameworks for procuring e-commerce applications. Planning for implementation. Planning releases and integrating release with overall business strategy.

Service issues. Configuration and release management. Change management. Capacity management, including demand management and application sizing. Availability management. Management of service level agreements. Planning for disaster recovery. Evaluating success of e-commerce application. Measuring benefits.

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