CHAPTER 5
CONCLUSIONS AND SCOPE FOR FUTURE WORK

5.1 INTRODUCTION

e-Learning has emerged as a strategic issue for organisations because of its potential to enhance their learning abilities. The phrase “learning object” (LO) comes from the idea of object oriented programming, where in parts of a computer code are reused for various software applications. This concept was transferred to re-purposing content for different learning situations. Traditionally, e-learning content is designed as a large course that does not lend itself to potential reuse. However, with a LO approach, content is designed as smaller units of learning that support potential reuse, that can stand alone, and that can be made accessible to meet the “just enough” and “just-in-time” requirements of learners. Developing quality content for e-learning can be very expensive, time consuming and require specific expertise. Why not share and reuse existing content in the form of LOs?

Faculty, instructors and instructional developers seek tools to benefit their work lives and improve their students’ academic experiences. Instructors everywhere draw upon knowledge of their
discipline to fashion courses and lesson materials. Most often, they use resources from text books, lecture notes or media from institutional and personal collections. An area of increasing improvements and efficiencies is the use of technology-based tools to create, deliver and support learning. As the process of e-learning becomes more accessible and affordable, the notion of creating, sharing, and reusing learning objects and artifacts has become more mainstream. Increasingly, instructors use computers, scanners, digital cameras, graphic files, and other digital media tools and materials to build personal digital collections of instructional resources. So, that they can reuse and re-engineer it to suit their students’ learning needs, to adapt to new knowledge in their discipline area, or to address new experiences that their students bring to classroom.

- The traditional and e-learning architecture and instructional system design models are discussed.
- The problem of reusability and personalizing the learning objects to fulfill the needs of students are discussed.
- Finding ways to share and reuse learning materials without compromising educational effectiveness are discussed.
• The conversion of learning contents to reusable learning objects and the need for blended approach to make e-learning work, are discussed.

• The evaluation techniques, usability evaluation, design prescription and the results of the case study conducted using School e_Learn System are presented.

• Agent based learning object technique is identified as a mechanism to dynamically organize and deliver learning materials to satisfy individual learning requirements.

• The agent technology gives personalization, adaptivity and dynamic support. The steps involved in agent based learning object design for personalized e-learning system are explained.

• The revolution of learning Objects concepts and their various methodologies enrolled us to propose construction of an agent based learning object architecture for e-learning system design.

5.2 CONTRIBUTIONS & CONCLUSIONS

In this work, an agent based reusable learning objects are being used for personalizing the students needs and reusing the learning content. ABLO approach is based on pro-active autonomous software agents that are independent of hardware and software technologies. This represents a shift of focus in e-learning system
design from information systems to user-friendly learning objects. It gives a solution for personalized student centered e-learning system design and reusability of learning objects in different programs according to student levels. We implement the reusability of learning objects in analysis and design stage itself using an agent based learning object technique.

ABLO enables teachers to create and publish learning content in a reuse compatible manner, provides learning objects with means of further automating the preservation processes and it facilitates seamless interoperation between teachers, students and learning content.

- Literature survey for learning objects architecture components and techniques, has been done.
- A suitable agent based learning objects architecture is proposed for e-learning system design for improving the performance of students, teachers and to facilitate on-line learning.
- This architecture is classified into three main processes called object oriented analysis and design of learning objects, modified ADDIE model based instructional development of e-learning systems, agent based learning object architecture by encapsulating the agents with learning objects.
• We also propose end user applications which support personalizing the learning content, fixing the granularity of learning objects for different levels of students, learning object approach to create learning content and conversion of e-content to learning objects.

• Realization of agent based learning object architecture in e-learning system design to bridge the gap between the needs of students and learning content, are discussed.

• We address the inflexibility issues by separating content and context.

• we address the educational issues. “Results in a sense of ownership, acceptance and ability to realize the potential of technology in different contexts” (Gunn, Woodgate & O’Grady 2005) are discussed.

• We address the reuse issue: It gives the instructor confidence to use the ABLO in a variety of situations.

ABLO utilizes a set of interacting agents that can personalize instruction based on an individual’s prior knowledge as well as his cognitive and learning needs. The agents monitor the e-learning environment and improve learning and collaboration based on learner’s prior knowledge, social characteristics and learning style. The
fundamental model of personalized learning is an integration of techniques from “technology-based research”, aimed at providing e-learning systems with more flexibility and adaption to individual learners in actual end use.

Research has shown that organizational learning does play an important role in the generation of organizational performance (García-Morales et al. 2006) and that properly managed e-learning programs do provide measurable benefits to organizations. Agents can be used to generate learning progress reports against predefined goals and can document learning efficiency as well as learning effort (Huang et al., 2006b). This should allow organizations to manage their e-learning programs to provide the materials and courses that are of the greatest benefit to the organization. The ability to measure the impact of the organization’s e-learning program is another important benefit of implementing an agent-based e-learning system. The main objective of this thesis is to suggest a technique, which simplifies the e-learning. the agent based learning object for e-learning system design is given as a solution to this.

5.3 FUTURE ENHANCEMENTS

The future enhancements will be to make use of the technique of agent based learning object for e-learning system design for e-learning
for special populations like blind, deaf, physically and mentally challenged students. Also, the techniques discussed in the thesis can be implemented in real life situations and comparative studies can be made with other existing techniques. E-learning is as effective as any other learning method when:

- The organization's expectations are clearly identified.
- The learner's needs and readiness are properly considered.
- Learning objectives merge with students need and sound pedagogical thought to guide the course design.

In short, for any learning opportunity to be effective, regardless of delivery means and methods, we must consider the above three points.

5.3.1 Implementation issues

- Training human tutors is expensive and human tutors are not always consistent.
- Students require extrinsic motivation and monitoring to complete lessons outside the traditional classroom environment.
- Students frequently skip ahead and do not read many of the passages and instructions (Jacobson, Maouri, Mishra, & Kolar 1995).
• Students make lots of spelling errors in their typing and also write often short responses.

• Students with low prior knowledge and poor reading skills appeared to be discouraged by numerous attempts to complete their tasks.

• Agents based e-learning showed that agent usage in learning increases students motivation and engages them more.

• Agent preference gains more significance so that the most appropriate agents for each individual student may also be used for designing personal coaching like (more individualized) e-learning.

• More studies should be done related to student preferences and usages of game-based learning activities.

• Computational issues
  ✓ how much can be done actively?
  ✓ space-time trade-offs
  ✓ can purposes and learner models constrain the mining, clustering, and filtering algorithms?
  ✓ can purposes cover a domain and be re-used in other domains?
  ✓ can learner models be standardized and shared?
• **Social issues**
  - what kinds of pedagogy can be supported?
  - environment can be constrained
  - learner can be constrained
  - feedback from learner is natural and serves a pedagogical purpose.

5.3.2 **Design and implementation of LOs: key challenges**

There are a few lingering issues that need further development before a LO culture becomes more firmly established in academic circles:

- **A culture of reuse:** Investment in repository tools, training, and legislative support by institutions or governments will not succeed unless we can see the value in reusing and re-engineering instructional content.

- **Technical expertise:** Although learning objects can be defined as digital or non-digital, many examples are digitally based and are highly interactive, effectively incorporating audio, images and text. Designing high-end multimedia-based LOs requires specific, and at times complex, technical skills in using specific software applications, such as the Macromedia Dream weaver
Web development tool. However, new tools are constantly being developed that require less technical proficiency.

- **Educational design:** A learning object will not effectively promote learning unless basic instructional design principles are applied. Sometimes, the novelty of the technology becomes the focus through incorporating a series of flashy multimedia features, without adequately considering the educational objectives or providing mentally stimulating activities and assessment opportunities.

5.3.3 Intellectual property (IP) and copyright issues

Institutions wanting to form their own LORs must have a clear and legal reuse licensing policy, either in the form of an international model such as Creative Commons or localised models such as BC Commons.

- **Quality assurance and design standards:** Addresses quality assurance and design standards through voluntary peer review or mandatory systematic review initiatives. This is increasingly important, as more and more instructional media and content become available for reuse internationally.

5.3.4 Copyright and licensing

- **Creative commons-** The Creative Commons digital copyright
and licensing model from law researchers at the Stanford University Law School in the U.S., is a digital rights management mechanism for sharing and reusing learning resources or other creative works. Creative Commons provides its users with a set of licenses from which to choose. Creative Commons is based on the Open Source Software (OSS) community’s approach to resource sharing, where the original copyright of a work (usually software code) is held by a developer who freely licenses the code to other developers, on the condition that all ongoing improvements and derivations of the code are made available to the wider “community of interest” in perpetuity.

**BC Commons** — BC campus, a collaborative initiative of the Ministry of Advanced Education (AVED) and 26 public post-secondary institutions in British Columbia (BC), Canada, uses a model similar to Creative Commons. The BC campus management team of senior educators and technical developers created a single “point of presence” Web-based learning portal that provides BC learners and educators with academic and student support services. BC campus learners can find online information about BC institutions, apply for admission, register for courses, audit their prior learning and credentials against programs they wish to take, obtain counseling and financial aid services, access online library services, and take courses.