

# How Reusable are Learning Object Templates : A Case Study

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## ABSTRACT

The purpose of this paper is to share experiences gained at Open University Malaysia on the reusability of learning object templates. Learning object templates are a suite of instructional templates created collaboratively between Indiana University, Bloomington and Open University Malaysia. These instructional templates include but are not limited to the following: case-study, decision making, intelligent paragraphing, analytical thinking, time-revealed scenarios, matching and empirical observation. In propagating the culture of reusability of templates, subject-matter experts have been trained to create e-content using these templates. A simple but powerful training model has evolved at the Open University Malaysia to suit the demands and short-comings of local needs. Various content types were created as a result of the training and in this paper we will share experiences with subject matter experts, related to content in environmental science and corporate governance. Here, we will share the extent to which subject matter experts were able to reuse the templates and also the ability of the programmer to adjust the templates to accommodate minor changes that were incurred in reusing existing template structures. Other relevant information will be shared, such as methodology used to train subject-matter experts, findings of two case studies quoted in this paper, verdict on how reusable are learning object templates and recommendations on future adoption of such an initiative to meet the UN Millenium Development Goals.

## INTRODUCTION

Learning object philosophy is beginning to shape the manner in which e-content is being created. It is timely to think and develop upon this philosophy to meet the demands of personalised, flexible on-demand learning. In this respect, the most viable medium of delivery is the Internet and for optimised used of the medium, learning objects may provide some of the solutions. Generally, learning

objects can be defined as small chunks of content that are interactive in nature that allows a learner to apply knowledge that has been acquired. The most interesting feature of the learning object is its ability to be reused. In this respect although there are two sides of reusability, the focus of this paper will be reusability with a change in content.

## **DEFINITION OF LEARNING OBJECT**

The term learning object, first popularised by Wayne Hodgins in 1994 is yet to attain an acceptable definition that encompasses characteristics, which differentiates it from any other content. From a survey of definitions, anything and everything seems to fit the definition: from digital to non-digital content, from large to small objects (in terms of digital weight), and from interactive to non-interactive content. One definition of learning object that enhances both the capabilities of learning and the networked environment is that forwarded by Dunning (2002): learning objects are made up of interactive content that allow a learner to demonstrate mastery of content by: identifying features and processes, solving problems, interpreting empirical observations and enhancing critical thinking processes. Some important features of a learning object leading towards learning efficiency are that it should consist of a learning outcome, an interactive exercise and a compelling feedback mechanism. In a networked environment, a learning object should possess the following characteristics: digital and deliverable over the network, reused, interoperable and easily adapted. The most important characteristics of a learning object is the ability to be adapted and reused, leading to the idea of reusable learning objects (Kaur, 2003).

There are 2 issues here that need further clarification:

- Reusing without change in content: This is the current accepted meaning of most proponents of learning object. For such a situation, it suffices to look at the metadata and adopt the learning object.
- Reusing with a change in content: This is more to suit to the learner's specific needs. For this to happen, TALON has created reusable templates according to instructional strategies. According to Polsani (2003) " A learning object can avail itself of the flexibility, scalability and adaptability offered by information technology only when the object in itself is predisposed for reuse by multiple developers in various instructional contexts" (p.4).

Thus, given this perspective of strategy and tactics, learning objects are strategic assets that are deployed and redeployed in carefully designed and specifically executed instructional situations to facilitate effective learning (Polsani, 2003).

## **TALON SYSTEM**

The Teaching and Learning Oriented Network (TALON) system in developing learning objects is based on the idea of teaching and learning instructional templates which are based on and described in terms of teaching and learning styles and are therefore more accessible to instructors and designers.

Thus far, the group in collaboration with Open University Malaysia has developed 15 such instructional templates, which are designed in a way that they can be reprogrammed for any content area at minimal expense. This would allow instructors to design learning objects for their courses using most of the existing code for the template. "The TALON system allows an instructor to create learning objects on a discrete body of content in several learning modalities, and allow the student to learn in the modality best suited to his or her style of learning." (Dunning, 2002). A multimedia programmer would then insert the graphic and text elements required to complete the learning object in the design executed by the instructor. In most cases less than 15% of the code for the template would need to be rewritten each time the learning object is reconfigured at the experimental sites. The 17 US and 11 international colleges and universities that are using TALON are only redoing about less than 5% of the code (Dunning et al, 2004).

## **METHODOLOGY**

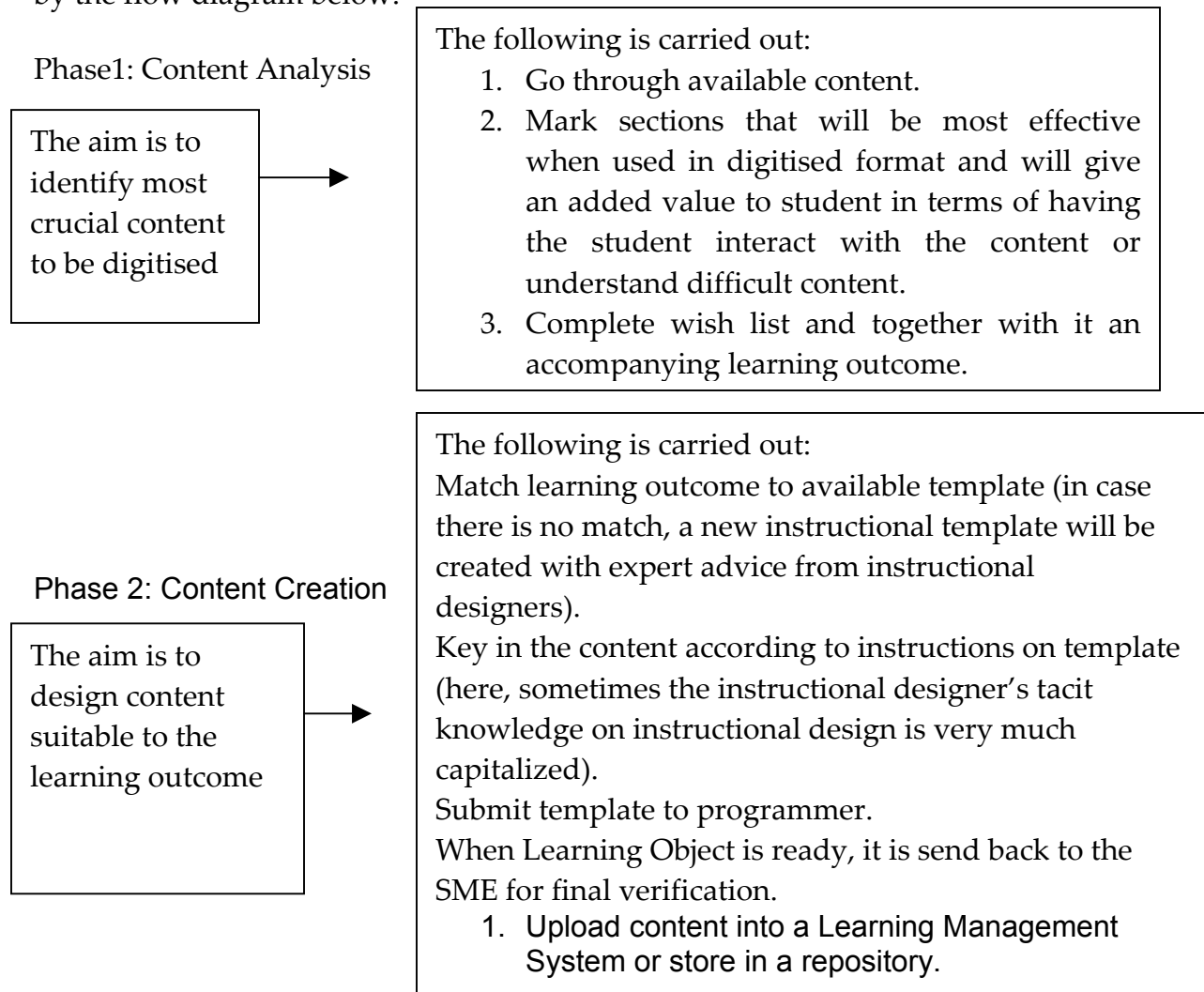
This study used qualitative methods of data collection. Data for this study was collected via observations made and recorded in journal entries. The sample group for this study consisted of OUM's development team which included instructional designers, a graphic designer and a multimedia programmer and subject matter experts (SMEs) from various organisations such as Open University Malaysia, a consortium of universities from Denmark, Thailand, and Malaysia and a private training centre in Malaysia that is TNE-PDS.

## MODEL FOR TRAINING SUBJECT MATTER EXPERTS

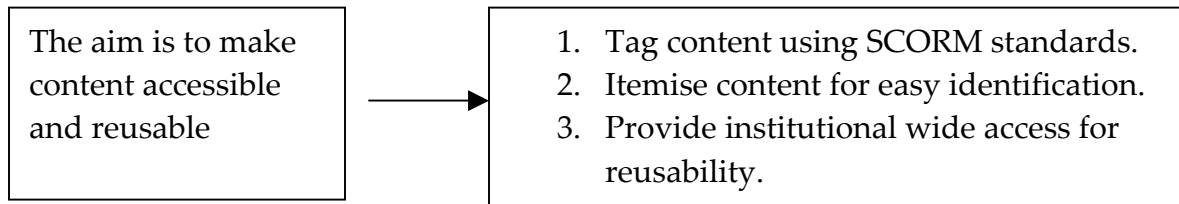
Based on characteristics of TALON System, OUM has created a model to train subject matter experts that will not incur cost for purchase of individual softwares. It also adopts a holistic view of looking at the content so that technology can be utilized only for those content that is more suited to the use of technology. As such the content creator is provided much guidance in identifying such content in the initial stage ( Vygotsky's zone of proximal development applies here) by identifying crucial content to be converted to a learning object. This is done by:

- First, guiding SMEs create a wish list (see Appendix 1).
- Second, asking them to identify the instructional strategy and outcomes for their 'wish' list (also see Appendix 1).

In 'b' above, where there is no matching strategy, SMEs are given expert support and guidance to come up with an instructional template that is more suitable to their needs. As such, the training of SMEs involves three phases as exemplified by the flow diagram below:



### Phase 3: Content Storage & Reusability



Base on the above processes, two case studies are discussed here. In discussing the case studies, the role of the instructional designer is exemplified whereby :

1. The Instructional Designer supports the SME in designing content in terms of ensuring that the learning outcomes specified by the SME are powerful enough to encapsulate the creation of e-content.
2. The instructional designer also helps the SME add instructional value, and enhance the motivational and creative aspects of the content.

## THE INSTRUCTIONAL DESIGN PROCESS

### Case Study 1: Designing of content using an existing template

A group of SMEs from Chiangmai University used the intelligent paragraphing instructional template to create their e-content for a course on Green Productivity for Industry. The following events took place:

1. The wish list and learning outcomes were reexamined (see Table 1)
2. Clarifications were made with regards the actual learning outcomes.
3. For the one specific learning object that was to be created, the fit between the number of options from the SME and the number of options that the template could accommodate was not equal.
4. As a result, recommendations were made to ensure the template was maximised to its fullest so that development time will not be affected.
5. Once that was done, suggestions were provided on how to enhance the instructional and motivational value of the learning object, and content was inserted into Powerpoint Template (see Diagram 1).

Table 1: Wish statements, learning outcomes and instructional strategy for course on Green Productivity for Industry

<b>Chapter2: Theory1</b>			
Title: Six steps of GP methodology and its tools	we need an easy way to illustrate to the participants what is 6 steps of GP methodology and its tools	participants can explain the goals of 6 steps in GP methodology participants can explain the tools needed for achieving the goal of each step	- True & false decision making  - Matching  Intelligent paragraphing

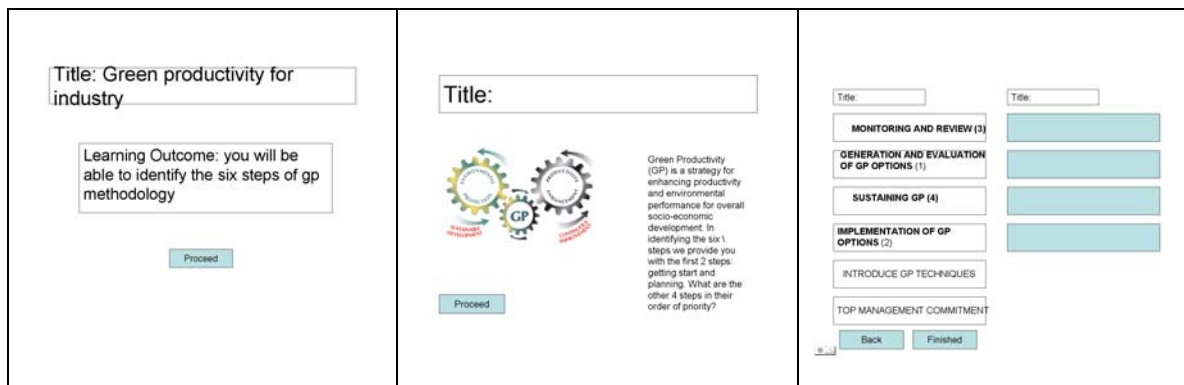


Diagram 1: Content inserted into Powerpoint Templates by SME

### Case Study 2: Designing of content by modifying an existing template

OUM has collaborated with a training and consultancy company known as PDS TNE to introduce e-Corporate Directors Training Programme. The learning objects development team consisted of a subject matter expert who is representative from PDS TNE, an instructional designer, a multimedia programmer and a graphic designer.

The following events took place:

1. The SME had given the content in MS Word file related to the topic of “The Importance of Corporate Governance”. The content was in MS Word file as none of the instructional template in MS PowerPoint form were available to meet the SME’s requirement.
2. Learning outcomes were drawn out from the content.
3. From the content received, it could be seen that the SME found using a case study format as the appropriate method to deliver this content effectively.
4. The instructional designer (ID) analysed and conceptualised the content, so that it could be presented using the correct instructional strategies. The ID had recommended that the most applicable existing learning object template was the ‘time reveal’ template, which was selected from a suite of learning object templates.

### *Development of Learning Templates*

In the development process, the multimedia programmer makes various decisions. These decisions become more fluid as the programmer gains more confidence with the software used as a result of more informed knowledge about the software. Here we present two case studies on how the multimedia programmer programmed instructional templates when there is very little change in instructional strategy and when is a lot of change in instructional strategy:

#### **Case Study 1: Development of content using an existing instructional template**

In programming the intelligent paragraphing template for the group of SME from Chiangmai University, the multimedia programmer used 10 minutes of his time. The following was the process.

1. Content from the power-point template was transposed onto the Flash template (see Diagram 2).
2. Minor changes were made, graphics were inserted and testing was done.
3. The SME was asked to check through the learning object and once verified, it was ready for use.



Diagram 2: Content developed using existing instructional templates in Flash format

### Case Study 2: Development of content by modifying an existing instructional template

For this case study, the basic development processes are similar to Case Study 1 involving the three steps.

It begun with the MMP transposing MSWord content into the Flash programme. However, for this case the multimedia programmer (MMP) wrote new codes for the learning object to develop a template similar to the 'time reveal' template. Modification of time reveal instructional template was necessary as the new template required a different set of frame arrangements than 'time reveal' template. Both the newly designed case study template and the 'time reveal' template have similar programming codes, the only difference is in the interface (look and feel) of the templates. According to the MMP it was easier for him to recode as the coding used to generate such template was very simple. The other reason was that it was easier to create the elements/objects in Flash file with new coding than arranging the frames and dumping the code into a new elements/objects created in the existing 'time reveal' template. This is justified as the time taken to develop the new template was only 4 hours.

Despite that, it should be highlighted that if the content had needed a different learning object template such as 'drag and drop' template, the coding would have been more difficult to be coded. The same template would have been used and there would not be an issue to recode a similar new learning object template.

## FINDINGS

1. In using existing templates, time and cost is saved tremendously and the quality of the content is improved.
2. In modifying existing templates, sometimes it is easier for the multimedia programmer to recode especially when simple recoding is involved.
3. In supporting SMEs it is important that instructional designers try to model as much of their tacit knowledge as possible. Once this flow of tacit knowledge is demonstrated, the SME becomes more comfortable with the skills needed of them.
4. In recreating templates, although initially, time is seem as 'lost', in the long run the whole team gains from the experience as new templates are created for reuse.

## **VERDICT: HOW REUSABLE WERE THE INSTRUCTIONAL TEMPLATES**

In short, whilst it is very difficult to reach a verdict in terms of the 'reusable' factor, the following may provide some guidance as to the extend of reusability.

1. Templates are reusable when the learning outcomes match those templates and in terms of cost and time, a saving of up to 80% is possible with no adverse effects on the quality of the learning material. The reusability factor is also affected by the expertise provided by instructional designers and multimedia programmers. Short-term gains are immense.
2. Where learning outcomes do not match existing instructional templates, and creation of new templates is imminent, there is very little saving in terms of time and money in the short-term. However, in the long-term, the organisation gains in terms of increase in value of organisational knowledge as well as increase in the number of instructional templates.

## **RECOMMENDATIONS FOR FUTURE IMPLEMENTATION**

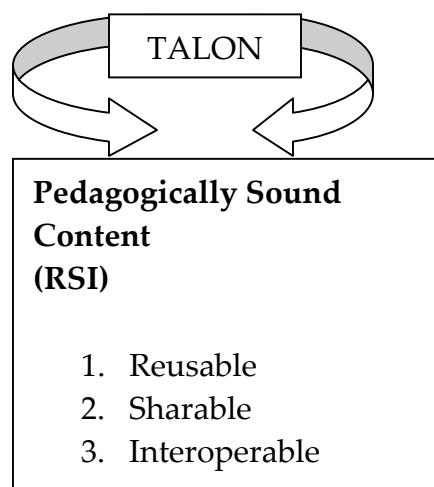
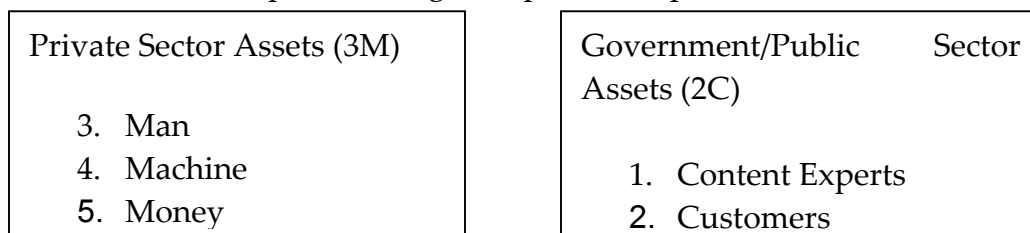
In order to maximise the philosophy of reusable templates, the following are some recommendations:

It is important that the team is able to commit and more importantly manage the time needed for such a course.

1. A proper training process for the whole team is important so that basic skills and ideologies are understood.
2. The instructional designer needs to understand the limitations of both the SME and the programmer and suit the instructional flow and extend of the content accordingly.
3. It is very useful to have instructional designers who are familiar with the subject matter.
4. It can be useful to have collaborations with other multimedia programmers as in-house programmers might have some limitations. A shared discussion forum can be created for this purpose.

## OUR RECOMMENDATIONS TO MEET UN MILLENNIUM DEVELOPMENT GOALS

Our initial findings point to the fact that the TALONS Instructional templates can support the 8<sup>th</sup> UN Millennium Development Goal, i.e. Develop a Global Partnership for Development. In this goal the 8<sup>th</sup> point i.e. “in cooperation with the private sector, make available the benefits of new technologies – especially information and communication technologies” is applicable to the TALON philosophy. As such we recommend here a model for implementation that will allow for the development of a global partnership.



In this model of implementation, the final outcome is the creation of powerful content that can be reused, shared and operated in cultures with different ICT infrastructure. The idea then is to capitalise on the strengths of the private and public sector. The private sector assets that can be capitalised upon are the 3Ms (Man, Machine and Money). By Man is meant the expertise in terms of programmers and graphics personnel. By machine is meant ICT related products that is computers, learning platforms, servers, satellite stations and software). By Money is meant sponsorship that can be used in various ways to improve the ICT capabilities of the public sector such as setting up of computer labs, Internet servers or training of content experts. It is important that these three components are further elaborated upon so that a more precise step-by-step procedure is produced.

On the other hand, the public sector is rich in content experts and customers. Content expert include personnel that is academically oriented and this can range from professors in the tertiary institutions to teachers in the primary schools, instructional designers and also other personnel in the academic field such as officers in the Ministry of Education. Customers include all the end users of ICT related content. Among others, these are the general public who may need to be trained in certain aspects such as AIDS, appreciation of environment and use of limited resources. It may also include reaching out to learners at the primary, secondary and tertiary levels so that they are better equipped with knowledge.

## **CONCLUSION**

Although, the learning object is created to accomplish the learning outcome of the learner, the reusability of the learning object template is not articulated by the learning object itself but by the pedagogical instructional value as determined by learners. The short development process, minimal manpower needed, convenient uploading and amendments, have convinced the development team that using reusable templates is worth the effort in producing effective learning content.

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## APPENDIX 1

**COURSE TITLE: Green Productivity (GP) for industry**

**Content That Has Been Identified for Learning Objects**

<b>Chapter and Title</b>	<b>Wish Statements – I wished:</b>	<b>Learning Outcome – You will be able to:</b>	<b>Instructional Strategy</b>
<b>Chapter1: Introduction</b>			
Title: Introduction to GP concepts and practice	we need tools for our participants to interact with teacher and each other through the internet	participants are familiar with each other through internet - participants can explain the concept of GP and sustainable development	Intelligent paragraphing
<b>Chapter2: Theory1</b>			
Title: Six steps of GP methodology and its tools	we need an easy way to illustrate to the participants what is 6 steps	participants can explain the goals of 6 steps in GP methodology participants can	- True & false decision making

		of GP methodology and its tools	explain the tools needed for achieving the goal of each step	- Matching Intelligent paragraphing
<b>Chapter3: Theory2</b>				
Title: GP techniques		we need good examples in best manufacturing practices	participants have knowledge about the GP techniques which can be used along with the GP tools for achieving the goal of GP steps	- True & false decision making - case study
<b>Chapter4: Case study</b>				
Title: Introduction to case study		we need to formulate the real case for participants to work on it	- participants understand the situation of project case work	- video information
<b>Title: case study step1 :</b>	GP team formation		- participants can establish suitable GP team for the case study	Forum & real time interaction
	walk through survey and information collection	We need effective tools for information collection and evaluation	- By gathering & properly analyzing given information, participants can figure out the real situation of the factory in the case study	

<b>Title: case study step2 :</b>	Identification of problems and causes	We need proper tools for identify the problems and root causes	- participants can identify the problems and root causes in the factory
	Setting objectives and targets		- participants can set the specific objectives and targets for GP implementation in the factory
<b>Title: case study step3</b>	Generation of GP options		- participants can generate the GP options using tools and techniques
	Screening and evaluation of GP options		- participants can choose the suitable GP options
	Preparation of implementation plan		- participants can create the effective implementation plan