ADAPTIVE AUTHORING OF ADAPTIVE HYPERMEDIA: TOWARDS EASIER, ROLE-BASED, ADAPTIVE AUTHORING

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ABSTRACT

The paper proposes a method to improve authoring by displaying a simplified view of an Adaptive Educational Hypermedia (AEH) system via a user role functionality matrix. Adaptive presentations are starting to appear in many applications, in education, but also beyond. For instance, the mobile phone world is increasingly applying adaptation to location, user, etc. However, a known bottle-neck in adaptation is the authoring process. In this paper, we propose a solution to this problem, by building on top of the visualisation paradigm. More precisely, we propose a method to improve authoring by displaying a simplified view of the authoring process via a user-role functionality matrix (FM). We aim to implement this feature in PEAL (a strategy authoring tool) to evaluate the FM’s usefulness in applying adaptations for diverse authors.

KEYWORDS

E-Learning, Adaptive Hypermedia System, Functionality Matrix, User Roles, LAG, Author Support, PEAL

1. Introduction

Current e-learning paradigms and learning management systems (e.g. Blackboard [1], Sakai [14], etc.) offer a ‘one size fits all’ approach to the delivery of learning materials. This means that every learner is given the same set of resources and learning material. What we notice is that the personalised approach to education is sadly lacking from most online systems [10].

Adaptive Hypermedia (AH) [2] improves the usability of hypermedia, by building a model of various aspects of an individual user, such as preferences and knowledge, and uses this information to adapt the content to the needs of that particular user. In contrast to traditional e-learning systems, where all users are directed to the same series of hyperlinks, adaptive hypermedia tailors what the user sees to the learner's goals, abilities, interests, knowledge, etc. [4].

However, although the AH approach has been shown to be useful [2], an author faces a multitude of problems in order to create an adaptive courseware and to re-use previously created material with different adaptation types. For example, in order to create a personalised, rich learning experience for each user, first, the content of the lesson has to be prepared. Different alternatives of the content have to be created for different users, which leads to different paths through that content. Metadata needs added for the labelling and annotation of the different paths. Finally a mechanism must be defined to guide the user through the different paths. This introduces a costly and complicated authoring process [10].

Authors may often lack the time or the skills needed to create new adaptation materials from scratch, and therefore any improvement in the reusability of adaptation strategies (which specify the adaptive behaviour as opposed to the content that these behaviours are applied to) is a major help in the authoring process [10].

Many Adaptive Educational Hypermedia (AEH) systems have been developed and tested in various disciplines and proven their usefulness for improved learning experience in teaching [5]. However authoring of adaptive courseware for learners with different needs still remains cumbersome. There is a real need to provide better authoring support in AEH systems [15].

As previous research [9] suggests, a possible solution towards simplifying the authoring process is that allocating different roles to authors. Research on current authoring tools also recommends reusing adaptive strategies to speed-up the authoring process [15]. The reuse can be clearer and better organized, if different roles create different parts of the authoring process, and may reuse the ones produced by the other roles.

In this paper we investigate the issues which address the problems faced by AEH authors. In particular, (i) we investigate the problems encountered by AEH authors with respect to adaptive behaviour authoring (ii) we develop techniques to improve authoring in AEH; (iii) we propose a new functionality matrix mechanism based on user roles and (iv) finally discuss how the design of AEH can be improved, to cater for different types of authors.
2. Background & Related Work
To prevent bottlenecks in the authoring process, several tools [13],[7],[8] have been created and evaluated, to address the need to make the authoring process less costly, in terms of time and effort required.

Continuous research [8],[15],[9],[11] on better authoring has resulted in several advanced authoring tools. Recent developments include the MOT 2.0 [11], the MOT 3.0[9] and the GRAPPLE [10] authoring tools. In the following, we only discuss these particular approaches, as directly relevant to our current implementation.

2.1 GRAPPLE
The Generic Responsive Adaptive Personalized Learning Environment (GRAPPLE) [10] is an enhanced learning environment that guides learners through the learning experience, automatically adapting to personal preferences, prior knowledge and learning goals, amongst others.

GRAPPLE includes authoring tools to create adaptive learning material for the learners. The Grapple Authoring Toolset (GAT) has three main components: a Domain Model authoring tool (DM), for creating a conceptual representation of an application domain (or "course"), a Pedagogical Relationship Type authoring tool (PRT), for defining types of pedagogical relationships between concepts and their associated adaptation, and a Conceptual Adaptation Model (CAM) authoring tool (also called 'Course tool') for defining the pedagogical structure of a course.

Adaptation should be based on many different aspects, including the user's background, knowledge and goals, but possibly also characteristics of the device (e.g. computer or PDA) used for learning. To achieve this, the GAT toolset is set up to allow for very general types of relationships and adaptation rules.

In addition, the latest development of the GAT toolset is differentiating between beginner and advanced authors. Beginner authors are not expected to be using the PRT tool for defining their own pedagogical relationship types, as this process requires programming knowledge, and domain experts or teachers may lack this type of expertise. Beginners are thus ‘allowed’ to create domain models, and to use these domain models, as well as a small set of predefined, GRAPPLE pedagogical relationships (PRTs) in the Course tool, to finalize their course. On the other hand, advanced users are additionally allowed to create types of pedagogical relationships. This setup gives advanced users more flexibility, but also more responsibility.

The GRAPPLE GAT toolset is thus the first adaptive hypermedia authoring toolset which proposes at least a rudimentary version of the division of roles in authoring.

2.2 MOT
My Online Teacher (MOT) [9],[12] is an advanced adaptive authoring system based on the LAOS framework [4] that can be used to author adaptive courses. MOT 2.0 focuses on including collaborative authoring and social annotation between communities of authors. Information collected from social annotation can be used to recommend adaptive materials for the authoring process. MOT 3.0 is the latest addition to the MOT system, and allows for the authoring of domain content (via a concept hierarchy), as well as various manipulations of this content, including fine-grained division of content pieces into reusable attributes, relating concepts via relations other than the hierarchical one (e.g., the relatedness relation), as well as basic functionality such as searches, etc. Additionally, MOT 3.0 allows labelling of these content pieces with information related to the pedagogical purpose of the teacher. MOT3.0 [9] uses the PEAL system [5] as an adaptive strategy editor, in which authors can use an adaptation language (LAG [13]) to program adaptation behaviours (strategies) for the AEH This separation of different tasks into different tools is known as the ‘separation of concerns’ [13], and is useful to promote the reuse of static and dynamic materials, separately. In its simplest form, this principle states that adaptation behaviour and the content of a course should be authored separately. Besides the obvious implications of reuse, this separation allows the two parts to be authored by different author roles [15]. This is vital if the aim is to not only simplify the authoring process but spread the authoring load and encourage reuse.

2.3 PEAL
The PEAL system [5] is an adaptation strategy authoring tool also based on the LAOS framework [4]. Since there are no standards for adaptation, PEAL uses one of the candidates, the LAG adaptation language [13], as a lightweight, exportable output format. This means that any system that can import the LAG language can use PEAL as an adaptation strategy authoring tool, and thus promotes reuse.

Authoring with the help of the PEAL system requires a more programming-savvy author. The PEAL tool [5] is designed to create adaptation strategies, and thus separates adaptation behaviour from content, therefore abiding by the ‘separation of concerns’ mentioned above.

As a direct consequence, due to the separation of concerns facilitated by the LAOS framework [4], the adaptation programmer can be a different person from the content author. Although LAG strategies are not aimed to be written by non-technical authors, they can be used (and reused) by content authors without any programming knowledge.

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2 Personal Digital Device
2.4 Authoring Imperatives

Authors may be unfamiliar with the complexity of the authoring process. Therefore, it is important that the system caters to the author’s needs. A recent study [9] on authoring tools suggests very useful and related functionality and support imperatives to help the authors. In particular, Support imperatives suggest adaptive functionality of the authoring system and simple access to reassembled adaptations. The system should allow access to simple reordering, labelling, searching, copying, pasting, linking and strategy editing. This is the line of research we follow up and expand with the current paper.

2.5 User Roles

Once the learning material to be used in a course has been created, adaptive strategies can be applied to allow the personalisation of the course to students. However the same level of attention to adaptation is not applied to authors. In other words, adaptation is generally only aimed at learners, and not at authors.

It might however be beneficial to show different authoring options to different authors, and to effectively allow for adaptive content authoring. This includes displaying some options and hiding other options, depending upon the variations amongst authors. For instance, with the GAT toolset in GRAPPLE inexperienced authors must be shown less complicated views of the system.

However, one generally unaddressed issue with adaptive authoring systems is that user roles are not normally used (an exception is the aforementioned GAT toolset, but even that system only allows a very primitive level of role separation). This means that most of the time, authors are expected to be experts in domain modelling, pedagogical authoring, programming, and perhaps other skills as well, which is unrealistic. This comes from the historic strive to allow as much flexibility as possible for authors. Moreover, authors are expected to have an all-encompassing expertise, unlike the learners. However, recent research in the GRAPPLE project [10] has repeatedly shown that authors are quite willing to sacrifice some level of flexibility for the purpose of having simple tools to work with.

Based on this, we currently believe that user roles should be used to classify different kind of authors. The purpose is to address the variation amongst authors and their expertise; for instance in, computer knowledge, user preferences, culture, department, or any other factor which could be set within the system. Depending upon these user\(^2\) attributes/properties, the AEH environment should adapt to display options most suitable for that author, to improve the interaction between author and the AEH environment.

3. Our Approach: User Role Functionality Matrix

Based on previous research results, our approach is based on the principle that an adaptive system should recognise an author, select the role which is attached to that author, and then apply adaptation to that author, i.e., show a customized view of the system. Furthermore, an authoring system should apply automatic adaptation based on related factors to guide the authoring process and develop confidence in the authoring environment.

Our approach is to apply user roles for each user of the authoring system. Thus, we propose to show a different set of options depending on an author’s role. For instance, differentiations can be made on whether the user is a new author or an expert author, and which AEH option might suit which kind of authors, and so forth. These options can be, for instance, presented in a matrix form, to allow for easier management.

Creating user roles in an adaptive hypermedia would provide easy user administration, as it would allow each user group to have certain rights to view a system’s capability based on the user model, user’s culture or user preferences, to name but a few. This would allow administrators to control the system access based on several factors, as selected by the administrator at system setup. These factors could be provided in a matrix form, for instance, to list all the user roles as columns and the system capabilities as rows. Here, system capability is a task or feature which can be performed within an authoring system.

In addition, a new user role can also be added and customised to address a particular need. For instance, novice users would only be shown the system tasks that they would be likely to have an understanding of. This will make the AEH authoring system more flexible and manageable, in permitting access control to the resources. This will provide ready control to different parts of the system. To illustrate this approach, we show how this can be applied to the PEAL system for authoring of adaptive strategies, although the approach is more wide-ranging and could be applied to authoring tools for adaptive hypermedia, in general.

The PEAL system permits the textual authoring of strategies in the LAG adaptation programming language, through use of the ‘Strategy Editor’ (Figure 1), as well as graphical authoring in ‘Graphical Editor’ as shown in figure 2 (this is simpler to use but less powerful than the text based system).

To create a simple role-based access in the PEAL system, new authors accessing the PEAL system will not be shown the ‘Strategy Editor’ as depicted in figure 1, and instead will see a simplified view of the system’s

\(^2\)Please note that user here refers to the author, and not to the end user of an adaptive educational hypermedia system, which is the learner.
capabilities, in-line with the author’s knowledge about the system.

Figure 1: PEAL Adaptive Strategy Editor allows advanced adaptation behaviours to be created using the LAG language. The strategy editor is aimed at programming savvy authors.

Figure 2: PEAL Graphical Editor allows strategies to be created graphically. The graphical editor is aimed at non-technical authors.

As previously stated, in our approach we propose a functionality matrix which categorises system capabilities according to user roles. The roles suggested in recent research [9] are Content Author, New Author, Intermediate Author, Experienced Author and Administrator.

This matrix will match the users’ roles against the system features, as shown in Table 1. This approach is extensible, as it allows more user roles and new system features to be added at any point in the future (in line with new research). In addition, by its very nature, it will allow easy allocation of system features to different user roles, making it flexible and scalable for future changes.

The PEAL capabilities (displayed in Table 1) include, amongst others, the option of accessing the Strategy Editor, accessing the Graphical Editor, being able to view and/or edit the content or strategies in both private (user’s own) and/or public (general multi-user area) spaces.

As can be seen from Table 1, the focus of this user roles discussed in this paper is that of the strategy author (the positions of new, intermediate and experienced are all strategy authors and the role of ‘administrator covers all of PEAL’s capabilities), although there is one role described for the ‘content author’. As this matrix is easily extensible in PEAL adding further content authoring roles would be very simple.

<table>
<thead>
<tr>
<th>PEAL Capabilities</th>
<th>User roles</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>(i) (ii) (iii) (iv) (v)</td>
</tr>
<tr>
<td>Strategy Editor</td>
<td>0 0 0 1 1</td>
</tr>
<tr>
<td>Graphical Editor</td>
<td>0 1 1 1 1</td>
</tr>
<tr>
<td>Quick Actions menu</td>
<td>1 1 1 1 1</td>
</tr>
<tr>
<td>Admin Options</td>
<td>0 0 0 0 1</td>
</tr>
<tr>
<td>Editing Private Strategies</td>
<td>0 1 1 1 1</td>
</tr>
<tr>
<td>Editing Public Strategies</td>
<td>0 0 1 1 1</td>
</tr>
<tr>
<td>View Strategies</td>
<td>1 1 1 1 1</td>
</tr>
<tr>
<td>Editing Private Content</td>
<td>1 0 0 0 1</td>
</tr>
<tr>
<td>Editing Public Content</td>
<td>1 0 0 0 1</td>
</tr>
<tr>
<td>View Content</td>
<td>1 1 1 1 1</td>
</tr>
</tbody>
</table>

Table 1 – Functionality Matrix
(‘0’=disabled and ‘1’=enabled)


4. Case Study

The following case studies show five different scenarios to define the need of user roles in AEH systems. The scenarios are based on five different types of users: Content Author, New Author, Intermediate Author, Experienced Author and Administrator.

Scenario 1: Content Author

Dr. Alam is a content author and wishes to create an adaptive course for first year Roman history students at the University of Warwick. Dr. Alam wishes to use an authoring system that guarantees content re-use for automatic authoring. Based on his previous experience, he feels confident in using the PEAL system for the purpose of authoring his adaptive content adaptation. Since Dr. Alam is not a programming savvy author, he wishes to create course contents only and therefore wishes to use existing adaptive strategies created by other authors. He expects the system to help in the content creation process, reusing his earlier material and in choosing the best adaptive strategy.

Requirements resulting from the Scenario:

The system should be able to identify him as a content author, and then the system should apply adaptations to the environment, to suit his preferences and background. Therefore system should show content created earlier
(both his own content and that of others) and the previously created adaptive strategies (from the other authors); finally, these adaptations should be easily maintained by the system administrator, to address future needs, as the author gets accustomed with the environment.

4.1 Scenario 2: New Author
Dr. Yaacob is a new author and wishes to create an adaptive course for first year computer science students at the University of Warwick, as adaptive hypermedia has shown to result in a better learning experience due to its benefits to learner customisation [2]. Additionally, Dr. Yaacob wishes to use an authoring system that guarantees advanced support functionalities such as automatic authoring and reusability. Based on this, she has decided to use the PEAL system for the purpose of authoring her adaptation strategies, whilst re-using the content from other authors. As a new author, Dr. Yaacob does not fully understand the capability of the adaptive system and how it can be best utilised. Since Dr. Yaacob is not a programming savvy author, she just wishes to create new strategies by using the existing adaptive strategies created by other authors. She expects the system to help in the creation process, and in choosing the best adaptive strategy.

Requirements resulting from the Scenario:
The system should be able to identify her as a new author (focusing on strategy authoring), and then the system should apply adaptations to the environment, to suit her preferences and background (such as access to extant strategies and the graphical authoring tool to create her own). The system should also track how long an author has been using the system, in order to advise the administrator to promote Dr. Yaacob to an Intermediate Author at a future point. Finally, these adaptations should be easily maintained by the system administrator, to address future needs, as the author gets accustomed with the environment.

The automatic recognition, automatic environment setup and the automatic promotion represent adaptive features of the authoring process, thus showing the need for adaptive authoring (next to adaptive learning).

Scenario 3: Intermediate Author
Dr. Bertrand is a moderately experienced author and has previously created strategies for use in an adaptive course at the University of Paris. As he has grown in confidence at creating strategies Dr. Bertrand wishes to share them with his colleagues. He knows that PEAL has recently promoted him to ‘intermediate author’ and taking advantage of this contacts colleagues and other PEAL users with his new strategies.

Having used PEAL already Dr. Bertrand is considered a mildly programming savvy author. However he still expects the system to help in the creation process, and in choosing the best adaptive strategy.

Requirements resulting from the Scenario:
The system should be able to identify him as an intermediate author, and then the system should apply adaptations to the environment, to suit his preferences and background. As such he will also be given permission to share his strategies with other authors. The system should continue to track how long an author has been using the system, in order to propose to the administrator to promote, Dr. Bertrand to an Experienced Author. Finally, these adaptations should be easily maintained by the system administrator, to address future needs, as the author gets accustomed with the environment.

Scenario 4: Experienced Author
Professor Staley is a strategy-expert author and wishes to create an adaptive course for the final year Computer Science students at the University of Warwick. Having authored many adaptive courses, Prof. Staley is well aware of the benefits of AEH systems, such as customized learning experience, lower overheads for students, etc. Additionally, he desires the use of an authoring tool which provides automatic authoring, re-use and interoperability. As an experienced author, Prof. Staley has a better understanding of the adaptive system and its capabilities, and thus he selects the PEAL system to author his strategies. PEAL will allow Prof. Staley to not only edit strategies in the graphical authoring tool but the more detailed and complex (and subsequently more powerful) Strategy Editing tool.

Requirements resulting from the Scenario:
The system should be able to identify Prof. Staley as a experienced strategy author. Then, the system should apply adaptations the environment, to suit his role and preferences. This level of author has all of the previous strategy authoring permissions (to edit both public and private spaces) as well as access to the textual strategy authoring tool. Again, these adaptations should be easily maintained by the system’s administrator, to address future needs.

Here as well, the automatic recognition, automatic environment setup and the automatic promotion represent adaptive features of the authoring process, thus showing the need of adaptive authoring (next to adaptive learner environments).
Scenario 5: Administrator
Mr. Kesteven is the system administrator and would like to have a clear view on existing user roles, and their rights, in terms of selected system capabilities.

As a system administrator, Mr. Kesteven wishes to be able to grant rights as he sees fit (and fix any bugs or other problems that arise during the running of PEAL). For instance, he may wish to enable the strategy editor for an experienced author, such as Prof. Stanley. He may wish to enable the quick action toolbar for all system author roles, and to define a new author role with a set of system capabilities selected for this new role.

Requirements resulting from the Scenario:
The system should identify Mr. Kesteven as an administrator. Then the system should apply adaptations to the environment to provide administration options, such as viewing the matrix of user roles against the system capabilities for easier administration, granting rights, creating and deleting users, etc.

For the administrator persona, the automatic recognition, and automatic environment setup represent adaptive features of the authoring process, thus showing the need for adaptive administration (next to adaptive authoring and learner environments).

5. Design and Implementation
The scenarios above create the requirements framework for our research work. In this way, we are able to design the different author adaptations defined in the functionality matrix to allow a different set of system capabilities to be applied to different user roles. Here the following roles are used to describe the design and implementation solutions we envision: Content Author; New Author, Experienced Author and Administrator. The Intermediate author has been omitted due to lack of space but would be easily envisioned.

The toolbars as presented here can be extended, based on the progress of the tool as well as the individual needs of the respective authors, and should be just envisioned here as examples.

5.1 Environment for the Content Author
If the content author logs into the system, the system would show options related to that author, i.e., quick actions, and the content creation toolbar will be shown. The authors will see the most relevant features of the system which they can use (as depicted in figure 3) to simplify the content creation process for the author.

Not only system capabilities can be filtered by user roles, but other components can also be fine-tuned, such as the option to display a sub-set of LAG programming constructs. The system can gradually show more constructs, as the author becomes familiar with the environment and the LAG language. In addition to that, the environment could provide help on using the newly displayed authoring options, to help the author through these options, and ultimately to make the authoring process easier.

5.2 Environment for the New Author
This system design for a new author describes what options will be shown if a new author logs in, and how the functionality matrix can be used to define options and rights which should be relevant to this user.

As such the system will adapt its toolbar to cater for a new author and show the suitable options on the quick action toolbar, (which administrators can configure via the functionality matrix) such as viewing existing strategies, along with help options available to aid the new author in using the graphical authoring tool (figure 2) to create their own strategies based on previous ones.

5.3 Environment for the Experienced Author
If an experienced author logs into the system, the system would show the most relevant options for the experienced author role. For instance, the Strategy Editor as depicted in figure 1, will be shown to such an author, since the role is aimed at programming savvy authors, to give them finer control for their adaptive strategy. The authors will be shown the most relevant features of the system as shown in figure 4 which they will easily be able to use. For example, programming structures ‘IF’, ‘ELSE’, ‘FOR’ and ‘WHILE’ loops as well as any other structures that are appropriate for this level of strategy author.

5.4 Environment for the Administrator
Similarly, when the administrator logs into the system, the system should identify the user as being the administrator, and thus provide administration options to the user.

For example the administrator may wish to promote Dr Bertrand from Intermediate to Experienced author, the administrator tools will allow for this to be simply overseen and enacted. This will make the administrative process easier and less time-consuming.

Figure 3 Toolbar for the content author
6. Discussion
Adaptive Educational Hypermedia (AEH) offers a more intelligent and customised approach to the field of e-learning than the traditional linear methods. However, authoring materials for AEH remains a complex task. Previous research has provided different solutions.

Here, we propose a more detailed role-based approach to the authoring paradigm. To this end each author would belong to a predefined user role, and each user role is associated with a set of authoring system capabilities (in our example, represented by a toolbar) which will define certain system adaptations to match a particular user role. A simple matrix has been presented to allocate a set of capabilities to each user role. This set of capabilities can be translated by the system (e.g. PEAL) automatically, for example into a toolbar, to provide quick access to the system’s capabilities. This means, for instance, that more programming savvy authors would get access to more advanced features, and new users will get access to basic capabilities as well as more help options.

The Functionality Matrix (FM), as detailed in Table 1, allows for easier user management, because it lists all the user roles within a system, as well as their access permissions. In addition, an adaptive system could control these attributes based on some pre-defined criteria, to apply adaptations automatically. For instance, if an author wishes to gain access to an experienced author’s feature set, these can be dynamically granted by the system once the author meets the pre-set criteria. In such a way, a new role can be automatically added to the list of roles of a given user (i.e. a new user becomes an intermediate one), and then appropriate access to resources can be configured by the system. This will allow users to be able to have access to system features, according to both their preference and knowledge. This can be either changed automatically by the system, or can be allocated to be changed by the system administrators.

This allows users to acquire more system capabilities, as they gain experience in using the system (or upon request to the administrator). Similar techniques are used in game design, where a player can achieve more capabilities, i.e., better armour, weapons, etc., as the player progresses through the game.

Another semi-automatic way of allocating rights to users, beside knowledge and preference, is their status. This could be, for instance, the current position of the user, in the sense the department to which he/she belongs to, his/her teaching specialization, his/her level of expertise. Depending on these factors, the Functionality Matrix will be populated.

In principle, authors would keep their rights or acquire progressively new rights, as long as their experience with the system progresses. This also means that their initial rights, as a first-time author, would be limited. A challenge here would be to take into consideration their previous experience with similar systems. Currently, we allocate the task of deciding the correct starting point for a new user to the Administrator.

6.1 Quick Action Menu
Furthermore, quick actions could be displayed on a toolbar or a mouse context menu, in order for an author to be able to select any of them quickly. Ideally, an author should be able to change the items on the toolbar according to their own preferences, and view how the content would look like, if different strategies are applied, prior to its actual delivery.

Adjustments can be made to the content to better suit the needs of the learners. Also, this feature might also be used to view how existing strategies can be applied with ease, so the author can view how existing strategies will be displayed to the learner, hence making it easy for the author to choose a strategy.

7. Initial Evaluation
As the research is at an early stage there has been no evaluation of the issues raised in this paper as yet. However a formative evaluation of the methodology for the design & implementation of the features described here is being planned. This evaluation will address the following three user perspectives:

The evaluation from the system’s perspective includes:
- Is this methodology adaptable to suit authors changing needs?
- Does the methodology improve the system to create new user roles and new system capabilities?
- Is the adaptable toolbar helpful to the author?

The evaluation from the author’s perspective will have to address the following:
- Does the methodology display a less complicated view of the system to authors?
- Does the methodology improve the adaptive strategies and content reuse?
• Can the methodology be expanded to include new user roles and system capabilities?
• Does the methodology provide the desired adaptation?
• Does the methodology improve the learning experience of the author?
• Does the toolbar provide help to the author during authoring?

The evaluation from the administrator’s perspective:
• Does the proposed functionality matrix result in better user management?

The results from this evaluation will feedback into the ongoing, iterative design for role based authoring in AH systems.

8. Conclusion and Further work

In this paper we have proposed an approach to role-based authoring in Adaptive Hypermedia. In particular, we have proposed a solution based on a user role Functionality Matrix (FM) and have demonstrated that the FM would be useful in an adaptive hypermedia authoring system in that it would provide users with a simplified view of the system.

FM will provide the system with a simplified allocation method of rights to authors. Moreover, as the author gains confidence with the system, the system can use FM to increase the extent of authoring rights, and thus show more advanced relevant options, according to the author’s knowledge level about the system. Other factors can also be taken into consideration, such as the author’s main subject area, geo-location, culture etc. to provide extra information about the author, and to provide better and more focused support.

Our next task would be to implement this FM in the PEAL environment, in order to evaluate its usefulness on different users.

References


