

# Searching for “People like me” in a Lifelong Learning System

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**Abstract.** The *L4All* system allows learners to record and share learning pathways through educational offerings, with the aim of facilitating progression from Secondary Education through to Further Education and on to Higher Education. It allows users to create and maintain their timeline (a chronological record of their learning, work and personal episodes) and share it with other users, aiming to foster collaborative elaboration of future goals and aspirations. This paper describes the design of the system’s facility for searching for “people like me”, presents the results of an evaluation session with a group of mature learners, and discusses outcomes arising from this evaluation.

**Keywords:** lifelong learning, learning communities, personalisation

## 1 Introduction

Supporting the needs of lifelong learners is increasingly at the core of learning and teaching strategies of Higher Education and Further Education institutions and poses a host of new challenges, including providing better support for the planning of lifelong learning, and facilities for accessing cross-institutional resources. This is leading to research and development of new learner-centred models of organising and delivering educational resources – see, for example, the integrated framework proposed in [7,8].

The *L4All* system [4,5] aims to support lifelong learners in exploring learning opportunities and in planning and reflecting on their learning. It allows learners to create and maintain a chronological record of their learning, work and personal episodes – their timeline. Learners can share their timelines with other learners, with the aim of encouraging collaborative formulation of future learning goals and aspirations. The focus is particularly on those post-16 learners who traditionally have not participated in higher education. The system aims to allow potential learning pathways to be identified, exposing possibilities that learners may otherwise not have considered, and positioning successful individuals as role models to inspire confidence and a sense of opportunity.

The *L4All* User Model [2] comprises three parts:

- The User Profile contains personal information (e.g. name, gender, year of birth, email address).
- The Learning Profile contains information about the user’s educational and professional background (e.g. current occupation, highest qualification to

date, skills) and learning needs (e.g. willingness to travel, current learning goal, preferred mode of learning).

- The Timeline is the novel aspect of our User Model. It represents the learning, work – and, more generally, life – pathway of the user, comprising a chronological record of episodes that the user has entered into the system.

The *L4All* user interface provides screens for entry of personal details, for creating and maintaining a timeline of past and future episodes, and for searching over courses and timelines made available by other users, based on a variety of search criteria.

This kind of system contrasts with other learning environments, which typically provide learners with learning resources and tools supporting their study at a *single* institution. However, two limitations of the search facilities were identified during the first *L4All* piloting phase. First, the search was keyword-based, targeting the various fields of the User Profile, Learning Profile and Timeline, and was therefore limited in scope. In particular, searching over timelines returned matches based solely on the occurrence of the specified keywords in one or more episodes of the timeline but did not exploit the overall structure of the timeline. Second, the search results were not personalised according to the user performing the search.

A new facility has therefore been designed which supports personalised searching for timelines of “people like me”. This paper describes the design of this new facility, presents the results of an evaluation session held with a group of mature learners, and discusses outcomes arising from this evaluation. Providing this new facility has required also redesign of the original system’s GUI, due to the lack of extensibility of the previous user interface, and we briefly present these changes also.

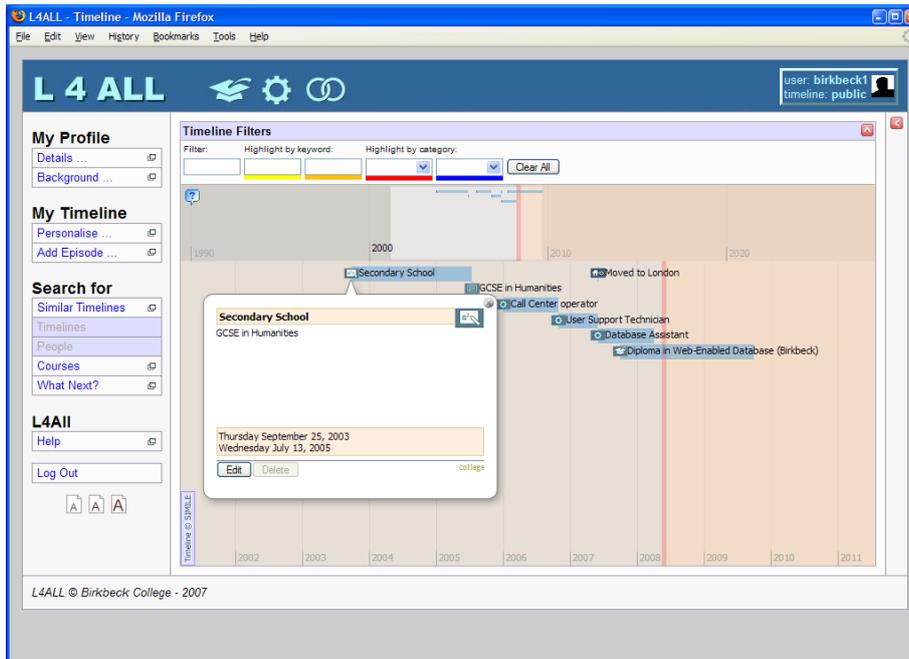
The paper is structured as follows. In Section 2, the new GUI is presented, highlighting the main changes in presentation and functionality compared with the earlier version reported in [4]. In Section 3, we discuss the similarity metrics used in comparing different users’ timelines. In Section 4, we describe the new search for “people like me”. In Section 5, the design and results of an evaluation study undertaken with a group of mature learners are presented. Section 6 summarises our conclusions, and identifies directions of further work.

## 2 The *L4All* User Interface

The original *L4All* Graphical User Interface used for the creation and manipulation of timelines was developed as a Flash module, embedded in JSP-powered web pages, and did not offer the necessary flexibility to incorporate the required new personalised functionalities. We have therefore redesigned the *L4All* GUI, using DHTML and Javascript-powered widgets to deploy the timelines. This has allowed us to improve the possibilities for learners’ interaction with timelines (both their own timeline and visual comparison between their timeline and other peoples’) and to provide more effective personalisation of timeline-based functionalities.

Figure 1 shows a snapshot of the main new GUI. At the core of the GUI is the representation of the user’s timeline, around which other system functionalities are organised: management of the user’s profile and timeline, keyword search for courses,

keyword search for people and timelines registered with the L4All system, and search for similar timelines. Access to these functionalities is provided by items within the left-hand side menu. These functionalities are made accessible through pop-up windows presenting the relevant interface (see, for example, Figure 2 below). These popup pages have been kept small and simple, and their purpose is limited to data input while user interaction with their results takes place within the main page.



**Figure 1. The main interface of the L4All system.**

A user can click on a specific episode within a timeline in order to see more details of that episode. A “balloon” pops up, as illustrated in Figure 1, showing more detailed information about the selected episode (dates, description), as well as giving access to Edit and Delete functions for the episode. In the rest of this section we focus on the new system capabilities accessible from the GUI.

## 2.1 Visualisation of Timelines

Visualisation of the timeline, as illustrated in Figure 1, is supported by the SIMILE DHTML widget (<http://simile.mit.edu/timeline>) and shows every episode in a user’s timeline in chronological order. The timeline space is divided into two zones. The large strip at the bottom contains the whole timeline in “real size”, with a time scale (typically in years) that allows a clear visualisation of every episode. The small strip at the top shows a summary of the timeline (typically in decades), providing a quick overview of the whole timeline (or at least a large part of it). Both strips can be dragged backwards and forwards, to show past and future episodes. The strips are

synchronised, so that dragging one will re-centre the other accordingly. This mechanism aims to allow easy and intuitive manipulation of the timeline by its user.

Each episode is represented in the timeline by an icon specific to the category of episode, which marks the episode's start, by the episode's title, and by a block representing its duration (if applicable – some categories of episode are instantaneous). Factual episodes are shown in blue and aspirational episodes (what the user might like to undertake in the future) are shown in orange. The timeline itself has different background colours to represent the past, the future, and the current date, which is shown as a light red bar crossing the strips. Most of these visualisation parameters can be modified by the user. The scale of the main strip can be modified (e.g. switching to monthly or yearly time increments), as can the colours used to emphasise different aspects of a timeline (background colour for the past and future, filling colours for factual and aspirational episodes).

## 2.2 Accessing L4All Functionalities

All popup windows have a similar layout – see for example Figure 2 showing a dialog box that allows users to enter or edit properties of an episode of their timeline.

The screenshot shows a web browser window titled "L4All Episode Editor - Mozilla Firefox" with the URL "http://l4all.dcs.bbk.ac.uk:8080". The main content area is titled "Edit Episode" and contains a form for editing an episode. The form fields are:

- Subject: Unknown
- Qualification: GCSE grades D-G
- Nature:  Fact,  Wish
- Start: 1995/10/01
- End: 1996/10/07
- Title: School
- Description: (empty text area)
- URL: (empty text area)

A calendar for October 1995 is open, showing the following dates:

wk	Sun	Mon	Tue	Wed	Thu	Fri	Sat
39	1	2	3	4	5	6	7
40	8	9	10	11	12	13	14
41	15	16	17	18	19	20	21
42	22	23	24	25	26	27	28
43	29	30	31				

A "Close" button is located at the bottom left of the dialog box.

Figure 2. Modifying the properties of an episode.

Most windows are form-based, using basic HTML widgets to support entry of the required information, and buttons for validating the form or closing the window. All

forms have a dual validation process. On the client-side, an AJAX script is used to check, prior to validation, the syntactic validity<sup>1</sup> of fields in the form e.g. well-formed dates, well-structured email addresses, entry of mandatory information. Then, on the server-side, the appropriate servlet verifies the semantic validity of the information submitted e.g. password is correct, episode exists before it can be modified or deleted.

### 2.3 Classifying Episodes

There are three types of episode – Personal (e.g. relocation, travel abroad, illness, marriage, death in family), Occupational (e.g. started work, set up a business, retired, did voluntary work) and Educational (e.g. attended college, university or school, attended a course) – and several categories of episode within each of these three types. Some categories of episode have a duration, while others are instantaneous. The user can elect to add a new episode to their timeline at any time, in which case they are prompted to add relevant information about this episode. For example, Figure 2 shows the entry form for a “school” educational episode, for which the user is required to enter a qualification level, a subject, whether this is a factual or an aspirational episode, and its title, description and start and end dates.

Four existing U.K. classifications have been used for classifying certain categories of episode: the *Standard Industrial Classification* (SIC), the *Standard Occupational Classification* (SOC), the *National Qualification Framework* (NQF) and the Labour Force Survey's *Subject of Degree* (SBJ). For details of the encoding and evolution of these standards, we refer the reader to the Labour Force Survey User Guide<sup>2</sup>. In particular, in our system:

- All Education episodes are classified both by a subject (SBJ) and a qualification level (NQF).
- Work and Voluntary occupational episodes are classified both by an industry sector (SIC) and an occupation/position (SOC)
- Business occupational episodes are classified by an industry sector (SIC).

The structure and identifiers of these taxonomies have been retained in our system but, for usability purposes, their depth is limited to four levels. We refer the reader to [9], Appendix D, for full details of the taxonomies used in our system.

### 2.4 Exploiting Timelines

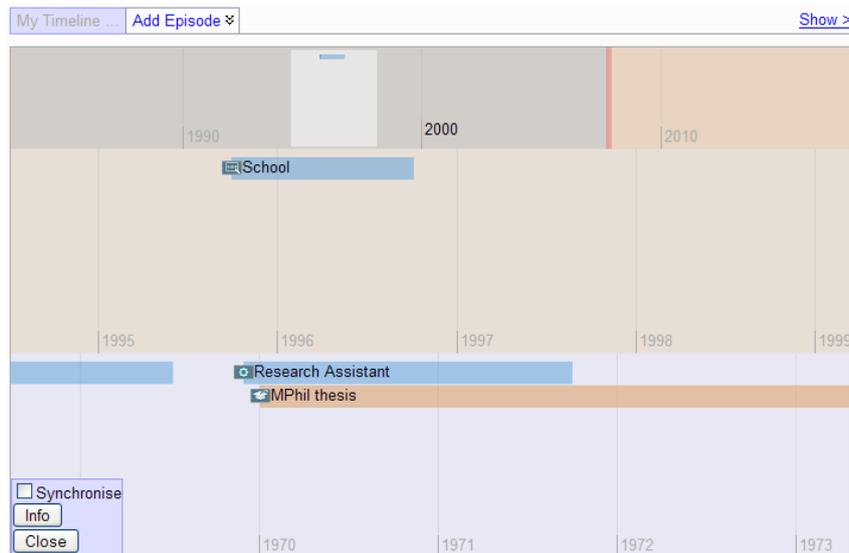
When a user searches for other timelines (either by performing a keyword-based search or by using the new “people like me” facility), the system returns a list of timelines. The user can select one of these timelines, which is then shown in the main page as an extra strip below the user’s own timeline (see Figure 3). The user’s and the selected timeline can be synchronised by date, at the user’s choice. Episodes within

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<sup>1</sup> Using Zapatec AJAX Form scripts (<http://www.zapatec.com/>), which are a fast and easy way to perform validation, provide feedback, and display error messages that enrich the user's experience while reducing the communications with the server behind the scenes.

<sup>2</sup> Labour Force Survey, see [http://www.statistics.gov.uk/downloads/theme\\_labour/Vol15.pdf](http://www.statistics.gov.uk/downloads/theme_labour/Vol15.pdf)

the selected timeline that have been designated as being public by its owner are visible, and the user can select and explore these.



**Figure 3. Displaying the user's timeline with another user's timeline.**

### 3 Comparing Different Users' Timelines

The initial prototype of the *L4All* system supported several search functionalities over users and their timelines. However, two limitations were identified during the first piloting phase: searching over timelines returned matches based solely on the occurrence of the specified keywords in one or more episodes of the timeline and could not exploit the structure of the timeline, and the search results were not personalised according to the particular user performing the search. An alternative approach was needed, that could take into account both these issues: in other words, some form of comparison between a user's own timeline and the rest of the timelines in the *L4All* repository.

String metrics (also referred to as similarity metrics) offer such a possibility. They have been widely used in information integration and in several fields of applied computer science [3,6]. In the context of Intelligent Tutoring Systems, they have been used in the REDEEM system [1] to compare alternative sequences of instructional activities as produced by authors. In the context of *L4All*, our main requirement for using similarity metrics is to encode the episodes of a timeline into a token-based string. Our encoding makes four simplifying assumptions (discussed in detail in [10]):

- the duration and dates of an episode have no particular significance,
- the gaps between episodes have no particular significance unless explicitly expressed as an episode,

- the categories of episode to be considered by the system in searching for “people like me” are to be specified by the user,
- the depth of classification of episodes to be considered by the system during the matching process is also specified by the user.

With these assumptions, it is straightforward to generate a token-based string representing the timeline. Each episode is encoded as a token comprising a two-letter unique identifier for the category of the episode (e.g. C1 for a College educational episode, Wk for a Work occupational episode etc.) and up to two four-digit codes classifying the episode according to the four levels of the appropriate taxonomies, as described in Section 2.3. As a result of the two first assumptions above, no time information is used in the encoding of timelines and only the relative position of episodes matters (with an arbitrary decision as to their ordering if multiple episodes coincide in time). Filters are applied to the string of tokens to remove those episodes that should not be considered in the current similarity search, as well as for limiting the depth of their classification. In the latter case, digits below the specified depth are replaced by 0, replacing the episode’s actual classification by a more general one.

We refer the reader to [10] for a comparison of ten different similarity metrics that we considered for trialling in the system. These were all part of the SimMetrics Java package (see [www.dcs.shef.ac.uk/~sam/stringmetrics.html](http://www.dcs.shef.ac.uk/~sam/stringmetrics.html)). For the version of the system that we evaluated with mature learners as discussed in Section 5 below, four of the metrics were deployed (Jaccard Similarity, Dice Similarity, Euclidean Distance, NeedlemanWunch Distance) and were described as follows, respectively, within the search for “people like me” user interface:

- Rule 1: Search for (unordered) subsets
- Rule 2: Search for ordered subsets
- Rule 3: Maintain order of episodes
- Rule 4: Full item-by-item search

## 4 Search for Timelines of “People like me”

The aim of this new facility is to help learners in identifying possibilities for further educational and professional development that they may otherwise not have considered, by searching for other people according to a set of user-selected criteria, and exploring the learning and professional trajectories of these individuals.

A dedicated interface for this facility has been designed, which provides users with a three-step process for specifying their own definition of “people like me” – see Figure 4. In the first step, the user specifies those attributes of their own profile that should be matched with other users’ profiles, which acts as a filter of possible candidates before application of the similarity comparison on their timelines. In the second step, the user specifies which part(s) of the timeline should be taken into account for the similarity comparison, by selecting the required categories of episode. In the final step, the user specifies the similarity measure to be applied, specifically the depth of episode classification to be considered by the system and which search method should be used.

Once a definition of “people like me” has been specified, the system returns a list of all the candidate timelines, ranked by their normalised similarity. The user can then select any of these timelines to visualise and explore, as described in Section 2.4.

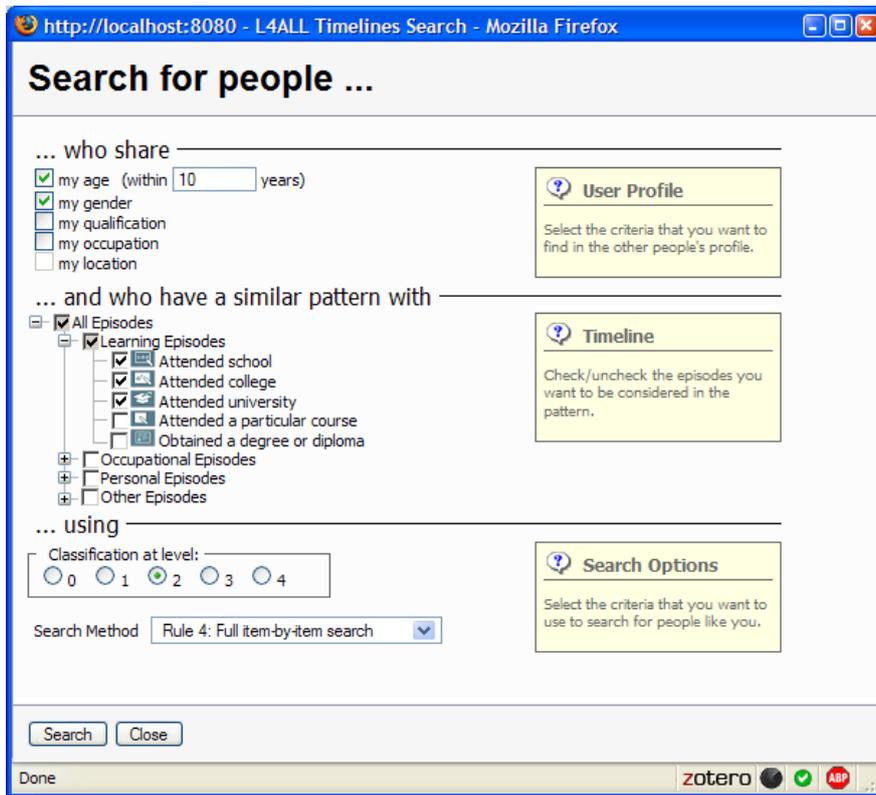


Figure 4. Searching for “people like me”.

The aim of this first design of a personalised search for “people like me” was to gather information about usage and expectation from users of such functionality. An evaluation session we undertook with this design is reported on next.

## 5 Evaluation

The evaluation was undertaken with a group of mature learners studying on the Certificate in IT Applications course at Birkbeck College. The evaluation session was organised around three activities:

- Activity 1: A usability study of the new system, focusing on participants building their own timelines and exploring also other aspects of the system.

- Activity 2: An evaluation of the new searching for “people like me” functionality, focusing on participants exploring different combinations of search parameters and reporting on the usefulness of the results returned by the system.
- Activity 3: A post-evaluation questionnaire and discussion session.

These activities were detailed in a script given to each participant (listed in [9], Appendix B). Activities 1 and 2 were structured as a sequence of tasks, described in sufficient detail for participants to undertake on their own. The tasks and the functionality targeted by each one are listed in Table 1. Most tasks were followed by a self-report form for participants to record their experiences. These forms contained 4 to 6 questions to be answered in the range of *very easy* to *very hard*. Provision was also made for participants to report any problems faced, and other issues they saw fit.

Activity 2 required a significant amount of preparatory work by the research team, due to the need for an appropriate database of timelines to search over. This required the definition of a database that:

- contained enough timelines for a search for “people like me” to be effective;
- contained timelines with different degrees of similarity with the participants’ identity for investigating the impact of different similarity measures;
- contained timelines that were short enough (in terms of number of episodes) for an easy visual comparison with the participants’ own timeline but long enough for similarity matches to be effective.

Which profile and timeline participants would use was also an issue. The best option would have been for users to have maximum familiarity with their profile and timeline, and therefore to use the profile and timeline they had created during Activity 1. However, since we did not know in advance what would be the participants’ profiles and timelines, it would have been difficult to build an appropriate database of “similar” timelines for supporting Activity 2.

**Table 1. Evaluation Tasks and Aims**

<b>Task</b>	<b>Evaluation Aim</b>
<b>Activity 1 – create your own timeline</b>	
Launch L4All	-
Register as a new user and start L4All	Access to login/registration page, use of registration form, understanding of required information
Acquaintance with L4All interface	Usability of web page, identification of interface widgets, manipulation of timeline
Complete the information in your profile	Usability of web page, use of editor, understanding of required information
Specify the 2 most important events in your educational experience	Understanding difference between profile and timeline, identification of interface widgets, use of editor, understanding of required information, manipulation of timeline

<b>Task</b>	<b>Evaluation Aim</b>
Specify the 2 most important events in your personal experience	Understanding difference between profile and timeline, identification of interface widgets, use of editor, understanding of required information, manipulation of timeline
Specify your current occupation	Understanding difference between profile and timeline, identification of interface widgets, use of editor, understanding of required information, manipulation of timeline
<b>Activity 2 – search for "people like me"</b>	
What is your definition of "people like me"?	Criteria used in searching for similar people
Log off and re-enter L4All	-
Explore your new identity	-
Search for "people like me"	-
Report on the search for "people like me"	Criteria used in searching for similar people, appropriateness and usefulness of results, understanding of "similar" timelines, appropriateness and usefulness of ranking

We therefore opted for an artificial solution for Activity 2: providing participants with an *avatar*, i.e. a ready-to-use artificial identity, complete with its profile and timeline, and generating a database of other timelines based on various degrees of similarity with these avatars.

Given the heterogeneous background of students at Birkbeck (which specialises in evening/weekend teaching for mature learners), it was a difficult task to decide what kind of profile to establish, even by examining the "featured students" feed on the College's website. After several tests and trials, the following decisions were made:

- Two avatars to be defined and distributed randomly among the participants.
- Each avatar to have 7 episodes (3 educational, 3 professional and 1 personal), spread over a 4 to 6 year period.
- The two avatars' profiles to be identical, except for the gender, with male for Avatar 1 and female for Avatar 2.

A summary of the two avatars' timelines is given in Table 2, showing each episode in each of the timelines, their start and end dates, duration, and two classifications. *Class 1* and *Class 2* refer to the primary and secondary classification of the episode, and the four-digit code indicates a specific element in the taxonomy. For uniformity, non-existent classifications are encoded as 0.0.0.0.

**Table 2. Summary of the two avatars' timelines used for the evaluation.**

<b>Episode Title</b>	<b>Category</b>	<b>Start</b>	<b>End</b>	<b>Dur.</b>	<b>Class 1</b>	<b>Class 2</b>
<b>Avatar 1</b>						
Secondary School	college	2003/09/25	2005/07/13	22	10.1.0.0	3.1.0.0
GCSE in Humanities	degree	2005/07/13	2005/07/13	0	10.1.0.0	3.1.0.0
Call Center operator	work	2006/01/01	2006/11/01	10	D.0.0.0	7.2.1.2

Episode Title	Category	Start	End	Dur.	Class 1	Class 2
User Support Technician	work	2006/11/01	2007/06/01	7	J.0.0.0	3.1.3.2
Database Assistant	work	2007/06/01	2008/04/01	10	C.0.0.0	4.1.3.6
Moved to London	moved	2007/06/01	2007/06/01	0	0.0.0.0	0.0.0.0
Diploma in Web-Enabled Databases	university	2007/10/01	2009/09/30	24	6.4.0.0	6.3.0.0
<b>Avatar 2</b>						
Secondary School	college	2000/09/01	2002/07/01	22	10.1.0.0	3.1.0.0
GCSE in Humanities	degree	2002/07/01	2002/07/01	0	10.1.0.0	3.1.0.0
Telephone Salesperson	work	2002/10/01	2004/10/01	24	K.0.0.0	7.1.1.3
Diploma in IT Applications	university	2003/10/01	2006/09/30	36	6.4.0.0	6.3.0.0
Maternity leave	carer	2004/10/01	2005/10/01	12	0.0.0.0	0.0.0.0
User Support Technician	work	2005/10/01	2006/11/10	13	J.0.0.0	3.1.3.2
Training Manager	work	2006/11/10	2008/09/30	23	G.0.0.0	1.1.3.5

A database of matching timelines was then generated using these avatars' timelines as a starting point, by defining and applying "deviation rules", i.e. a definition of how one timeline can be transformed into another one by adding, removing or modifying a single episode. The motivation for these deviation rules was twofold: first, having a quasi-automatic process for generating timelines on the basis of an initial template and transformation rule; and second, having this transformation reduced to a simple and identifiable operation that can be presented to users as an explanation of the similarity (or dissimilarity) between two timelines. Five deviation rules, listed in Table 3, were applied to the two avatars' timelines in a cascaded style: the first rule was applied to the 2 avatars, generating 2 more timelines; the second rule was then applied to these 4 timelines, generating another 4 timelines, and so on. This resulted in 64 timelines to search over (i.e. 62 generated timelines plus the 2 avatars'), comprising a mix of closely and remotely similar timelines for each of the avatars.

**Table 3. Deviation rules used to generate matching timelines.**

Rule	Description
1	Transfer all episodes two years in the past
2	Merge the first 2 work episodes
3	Change the classification of the last-but-one work episode
4	Replace last-but-one work episode by a personal episode (Gap Year: travel abroad)
5	Remove first personal episode

## 5.1 The Evaluation Session

Of the 10 people who had agreed to participate in the session, 9 people came on the day, and we refer to them as bbk1-bbk9 here. They represented a variety of learners in terms of their experience and background, as extracted (after the session) from their profile and timeline data recorded within the L4All system:

- Gender: 3 Female and 6 Male;
- Age: 1 in 20's, 3 in 30's, 4 in 40's, 1 in 50's;
- Background: a mean of 3 educational episodes (SD 1.7), 2.75 occupational episodes (SD 2.0) and 2.1 personal episodes (SD 1.2).

Participants were given access to a computer each, in one of the College's laboratories booked for this sole purpose. The evaluation script proved to be too ambitious for the intended duration of the session (60-90 minutes), as both familiarisation with the system and Activity 1 took longer than anticipated. Despite that, participants spent up to two hours working on the tasks and trying out the system. At the end of the session, a 10 minute discussion focused on their experience of the system, both at the level of functionality (present and future) and concepts.

## 5.2 Main Findings – Activity 1

Activity 1 was successful in eliciting positive and negative impressions of the L4All system. One of the positive outcomes was the amount of effort made by the participants in building their timelines. Their feedback indicated overall satisfaction with the main functionalities of the system. In particular, editing the profile, creating educational episodes, and creating personal episodes all had 40% or more of Easy/Very Easy responses (we refer the reader to [9] for a detailed breakdown of responses for each question). However, analysis of their questionnaires, as well as observations made during the session by the facilitators and in the final discussion, identified a number of issues to be addressed in the short and longer term. These can be summarised around three main areas: timeline representation and manipulation, classification of episodes, and privacy and scope of information:

**Timeline Representation and Manipulation:** The timeline widget was difficult to handle at first, especially since users started with an empty timeline containing no episodes (this has now been remedied by including an initial episode “registered with the L4All system”, which can subsequently be deleted by the user). It was not clear that you could manipulate the timeline widget ("*there is a lack of indication that the timeline widget can be dragged back and forth, scrolling in time*" – bbk5), neither was the meaning the widget itself clear ("*did not initially understand the purpose of the two bands in the timeline widget*" – bbk1). But this seemed to improve with repeated usage, as indicated by the participants themselves and reflected in their questionnaire responses. As participant bbk1 noted, "*Manipulating the 'detailed' timeline by double-clicking on the top 'summary' timeline is quite a good feature*".

In the discussion at the end, several people indicated that they would also benefit from access to alternative modes of visualisation of the timeline, in particular in a more familiar tabular form. This also raises interesting questions about the possibility

of visualising several timelines at the same time (a feature deemed desirable by several participants).

**Classification of Episodes:** Participants experienced problems in classifying their episodes: difficulty in finding the relevant element within the taxonomies employed (even though a search facility was available); mistaking the classification for the title or the description of the episode; and linguistic/cultural barriers for non-native English speakers. Adding to the difficulty was the fact that the relevance (or even need) for such a classification was not immediately apparent, as it only became apparent later, when searching for “people like me” in Activity 2.

However, the problem of episode classification seems to be mostly a usability issue. As evidence of this, we observed that all participants spent a considerable amount of time trying to specify the proper – to the best of their knowledge – classifications for their episodes. Every episode in the timelines they produced was defined with an explicit primary and secondary classification which, after analysis, seemed indeed to reflect the intended nature of the participant’s episode.

**Privacy and scope of information:** Concerns were expressed about the privacy of the timeline and profile information, and about potential abuse if the system is used without sufficient control. Some information requested was perceived as unnecessary (*“should be done at more of an arm’s length”* – bbk4) or at least there was no hint about its potential usage (*“it is not clear what advantage/benefit comes from the need to spend time in filling the timeline. Also there is no hint how detailed the timeline should be filled in”* – bbk3).

### 5.3 Main Findings – Activity 2

Activity 2 did not fulfil our expectations of identifying user-centred definitions of “people like me”. Most participants took this activity at face value, selecting some parameters, exploring one or two of the timelines returned, and starting again. They could see no reason to try different combinations of search parameters, as their first try was returning relevant results.

The participants’ responses on searching for “people like me” in the self-report forms were 58% Poor/Mostly Poor. Participants could not see the benefits of this functionality: *“you need to convey the benefit of finding people with similar timelines; this is CRUCIAL: what does it tell me if I find someone who is like me, based on criteria provided? Can I conclude anything from this? Need to create a set of examples to demonstrate how this timeline comparison is useful”* – bbk3.

Two factors seem to have had a negative impact on the outcome of this activity: the artificialness of the database used for the search (not enough variability in the timelines generated) and difficulties in grasping the meaning of some of the search parameters, notably the classification level and search method (*“search methods – rule 1-4 – are not clear”; “level of classification not clear at all”* – bbk1, bbk3, bbk4).

However, during the subsequent discussion in Activity 3, it became apparent that participants could appreciate what this functionality could deliver if it were applied in a real context: *“search needs to be based on aspiration/wish”* – bbk4.

Moreover, the post-evaluation question on the search for “people like me” functionality had only 8% of Poor/Mostly Poor, seeming to contradict participants’ experience while actually doing this task. This contradiction may be explained by the difference between reporting on this task on the spot, and answering a post-evaluation questionnaire after participants have had time to reflect on the task. This was also illustrated by the discussion at the end of the session, in which participants identified the potential of the search “for people like me” despite its usage difficulties.

## 6 Conclusions

Lifelong learners need to be supported in reflecting on their learning and in formulating their future goals and aspirations. Transitions from one stage of education to the next are critical decision points in a learner’s journey and more personalised and better targeted information may make these transitions more successful. In this paper we have described a facility for searching for “people like me” in a system that aims to support planning of lifelong learning. The aim of our first design of a personalised search for “people like me” was to gather information from users about their potential usage and expectation from such functionality, and we have reported on the results of an evaluation session held with a group of mature learners.

One outcome of the evaluation was to identify a range of usability issues, from low-level interface inconsistencies (improper labels, lack of contextual help) to more high-level usage obstacles (difficulty of first-time access to the system). Most of these issues have now been addressed.

A critical issue highlighted by participants in the evaluation session is the question of providing lifelong learners with support for exploiting the results of a similarity search. In this paper we have reported on a purely visualisation approach, based on displaying the user’s own timeline together with a timeline selected by the user from those returned by the search. A specifically designed dynamic widget allows the user to scroll backwards and forwards across each timeline and to access individual episodes.

Such an interactive visualisation of timelines certainly helps users to explore different timelines and episodes, but more proactive supports are also required. In particular, users need to be able to identify the *reasons* for the system deeming two timelines as being similar. Metrics such as Needleman-Wunsch (this is Rule 4 discussed in Section 3) do offer the possibility for such an identification, by enabling backtracking of the similarity computation and showing the alignments of the sequences of tokens i.e. the alignments between pairs of episodes in the two timelines. This opens up the possibility for more contextualised usage of timeline similarity matching in the L4All system, namely a “what to do next” facility which explicitly identifies possible future learning and professional possibilities for the user by indicating which episodes of the target timeline have no match within the user’s own timeline and therefore potentially represent episodes that the user may be inspired to explore or may even consider for their own future personal development. We will discuss such a contextualised usage in a forthcoming paper.

Future work also includes investigating alternative representations of the timeline,

with a tabular solution being a first possibility. From a technical point of view, deploying one (or several) alternative visualisations of timelines is not difficult, as the XML format used for the timeline data structure and the existence of well-established transformation mechanisms such as XSLT readily support this task. The main challenge will be to support the manipulation of these alternative visualisations, and in particular our aims of presenting simultaneously several timelines as a way of facilitating comparison and appropriation.

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