Integrated Web-based support for learning employability skills

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ABSTRACT

Learners of employability skills have four needs: awareness of employers' skill requirements; knowledge of their own levels of skill achievement; the ability to provide evidence for these achievements; and help with the process of action planning. The perceptions of students who had engaged in the process of recording achievement and action planning prior to entering higher education confirms the need for support for this process. LUSID is a Web-based system for learners to record experiences and achievements, analyse them in terms of employability skills, and carry out related action planning. It uses a detailed characterisation of skills which helps to explain what is needed by the learners, and to guide them through the recording, audit and planning processes. LUSID's features address the identified needs in several ways, as well as providing a sound basis for further developments including closer access to employers' skill requirements, on-line testing of skills where realistic, and perhaps integration with recruitment through employers using an adapted system to input job requirements.

Keywords

Recording, Profiling, Skills, Employability, World Wide Web

Requirements for learning employability skills

Educational policy in Britain is currently laying great stress on lifelong learning (DfEE, 1998). This is in recognition of changes to the typical patterns of working life, which make more varied demands on an individual's skills (Harvey, 1997; Leeds Metropolitan University, 1996). One very important strand to this policy is the requirement for individual, self-directed learning. This is receiving attention at a number of different levels: the early development of skills to plan and improve one's own learning, motivational aspects of lifelong learning and the support systems for individual needs, particularly those which can continue to operate outside the context of a traditional educational institution.

Coopers & Lybrand (1998) use the term 'employability skills' to include: 'traditional intellectual skills' (e.g. analysis, critical evaluation, logical argument, reasoning from evidence); 'the "new" core or key skills' (communication, application of number, information technology, teamwork, learning how to learn); 'personal attributes deemed to have market value' (e.g. self-reliance, adaptability, drive); and a knowledge of organisations and how they work. Individual learners may have a clear goal to maintain and update their employability skills, but they may not have all the means to do so. A coherent approach is needed which supports, encourages and motivates people in any walk of life to learn individually and to develop their employability skills, recognising the needs of learners outside as well as inside educational institutions. We suggest that this is best provided by an information and communication technology (ICT) framework which is coherent and accessible.

Accessible in this case means both that the learners must have easy access to the technological means of interaction with systems which implement the framework, and that these systems must be designed for ease of use, reducing to the minimum obstacles to the novice ICT user. Such accessibility issues are part of a wider debate which we will not be pursued in this paper, except to note that, if a system is sufficiently well-designed, it should in itself help with motivating the learners.

Assuming accessibility, what do learners need from such an ICT framework? We distinguish four aspects of what individual learners need to support their learning of employability skills. These can be supplied locally, or at a distance using ICTs:

➢ an awareness of what employability skills are, particularly as presently defined by employers;
➢ accurate knowledge of their own level of achievement in those skill areas;
➢ help in compiling records which provide evidence of those achievements;
➢ help with the process of action planning to improve their level of achievement in those skills.

Awareness of employability skill requirements

The first requirement is to know which skills are in fact needed in the labour market for which the learner is preparing. Learners need a general understanding and some detailed knowledge of what employability skills are. Additionally, any identification of these skills needs to be backed up by evidence that they really are the skills employers want. If this first requirement is not met, learners may misidentify the relevant skills and spend time learning skills that do not add substantially to their value on the labour market.

In principle, this awareness and knowledge can come from a variety of sources, and through a variety of media. Sources could include employment application forms, if the learner is able to view a good selection of these, but such a selection is not easily obtainable prior to applying for the jobs involved. Because the labour market is subject to both rapid change and regional variation, a single textbook as the medium is unlikely to be greatly useful, and definitions are in any case varied and possibly confusing (Coopers & Lybrand, 1998).

Instead, learners need access to the repositories of information in which such labour market information will be held, and that access is most quickly and flexibly provided by some kind of ICT such as the World Wide Web. Using the Web it is possible to compile useful pages containing links to appropriate sources of information and, given sufficient resources to keep them up-to-date, the usefulness of these links can be extended indefinitely.

Knowledge of levels of achievement

If learners have an accurate awareness of their levels of achievement in employability skills, in conjunction with a desirable skill profile for a job or a range of jobs, they will be able to recognise when and where they need to improve their level of skill. Otherwise they might either wrongly consider their skill level to be sufficient, or alternatively waste effort improving a skill that already is at a satisfactory level for their immediate job aspirations.

There are two general approaches to helping learners get an accurate assessment of their own skills. The first is to explain in detail how to recognise or diagnose the different levels of attainment. This is obviously susceptible to the learners' own bias in their estimation of their own abilities. The other approach is to provide reliable assessments of their ability. Some skills require observation of their application in performance by an experienced assessor - the skills of working in a group are the most obvious example. Other skills can be assessed by presenting tasks which require their application, where an unambiguous judgement can be made about the satisfactory completion of the task. Numerical skills, information technology skills and written communication skills do appear to lend themselves to this type of testing. Such tests need to be devised carefully, however, if they are to test the ability to select and apply skills and techniques to particular problems rather than just the ability to perform the skill itself. The individual who can perform calculations to a high level of sophistication when presented with problems in a familiar, typically de-contextualised, form may not be able to recognise which techniques need to be applied to a problem in a real-life context.

Administering paper-based tests or providing observational assessments requires a substantial resource, much of it the expensive time of a training or careers professional. However, it is possible to provide some self-testing facilities on-line. In the area of number skills, DIAGNOSYS is a well-known example, and the European Computer Driving Licence (ECDL) provides another example in the information technology skills area. An ICT system can of course provide explanations for self-assessment to any level of detail required, and in appropriate form: guidance on group skills and oral presentations, for example, could include video clips for comparison and modelling. Such guidance materials are limited only by imagination and the necessary specifications of the technology through which they are accessed.

Evidence for achievements

Learners seeking employment need an appreciation of how to support claims they make about the skills they possess. They need to be aware that evidence can take different forms: paper qualifications, testimonials and witness statements; product evidence (with verification that they were the originator); through to the ability to give convincing accounts of occasions when they exercised the skills claimed. While some of these forms of evidence are clearly stronger than others, all may be valuable in convincing employers. While most individuals can lay their hands on their paper qualifications and testimonials if they have them, they are less likely either to make a record of occasions when they demonstrated their skills or actively to seek some form of evidence from these occasions. An induction into the recording achievement process at school or college should have encouraged them to think in terms of recording and evidencing their achievements. To continue to do this on a regular basis generally requires some external support. The technical media for such support can range from paper-based through to floppy disks or the World Wide Web; however the medium has implications for the degree of face-to-face guidance required.

Whatever else the ICT system does, it should reinforce the learner's developing understanding of how to offer evidence for the possession of skills and enable easy access to the record(s) required in relation to a particular job application.

Help with the process of action planning

Once learners have both a knowledge of the skills needing to be attained, and an accurate picture of where their current levels lie in comparison to this, together with the appropriate evidence, they still need to take the necessary actions in order to improve their skills. This involves both identifying sources of training, and planning and scheduling time to practice skills. The efficiency of the process can be helped by providing timely references and pointers to educational opportunities and other materials which can be used to improve the skills. If this is not done, the learner is likely to use up time simply in the process of locating resources, or worse, fail to find sufficient resources at all. For some people (particularly those with the official status of students) this may be a straightforward matter of identifying modules within study programmes and allocating study time. Others with access to advice from training officers may be aware of the resources, but will need to create their own timetable. Others need help with the whole process of planning the required actions. Without this help, the improvement in the skill levels overall may be less than if the same time were used more efficiently and effectively.

We see these four components, or steps, as the most general categorisation of those needed to support the individual and motivate the development of life-long learning and employability skills.

Learners' needs: evidence from students' reports

Evidence of the recognition of these needs from the learner's perspective still tends to be anecdotal and a much greater research effort is needed to identify the factors, whether in the individual or the learning environment, which lead to the greatest benefit in motivating the individual to acquire employability skills. The evidence quoted here comes from an extensive questionnaire and interview study of young people entering higher education, which explored their previous experiences of the recording achievement and action planning process (Rouncefield & Ward, 1998).

The study was carried out in six HEIs by members of the Recording Achievement Consortium and involved 812 students commencing undergraduate study in 1994. This survey provided convincing evidence that, despite Government policy initiatives, few young people entering higher education had experienced a 'quality' introduction to the processes of reflecting on and recording their achievement and action-planning their future development. Of the minority whose experience had been positive (both in terms of their own perceptions and according to measures used by the team to differentiate a good quality process) they were able to identify a variety of reasons why the process had been valuable for them:

> "It has enabled me to plan 'A'level coursework and meet deadlines, which without (an)
> action plan would have been difficult" ... "it helps to build up a picture of yourself which
> can lead on to the option of picking a course for university" ... "it has allowed me to focus

on my talents ... so that I can gain a better outlook on any possible future moves" ... "I was able to locate my weakness and use this information to eradicate them".

The positive comments tended to divide into those students who saw the process as relating mainly to transition, and those (a smaller number) who appreciated the value of the process for planning and managing their studies.

In follow-up interviews a very small number were in fact continuing to use the processes they had been inducted into, although rather more accepted that they would find the process necessary to pick up again when it came to job-seeking:

"When I come to get a job it'll come in again, but that seems a long way away" ... "I recognise the connection between recording achievement then and thinking about competencies now, but I won't do it unless time is set aside or more pressure is applied. But it will be useful in 2-3 years time when thinking about jobs".

Few of these students were receiving support from any processes within their HE institutions to continue the process of identifying their skills and achievements and set targets for development. This is a significant finding in view of Recommendation 20 of the National Committee of Inquiry into Higher Education (1997)

"that institutions of higher education, over the medium term, develop a Progress File. The File should consist of two elements:
➢ a transcript recording student achievement which should follow a common format devised by institutions collectively through their representative bodies;
➢ **a means by which students can monitor, build and reflect upon their personal development.**" *(Our emphasis.)*

This recommendation shows the growing awareness of the need for all educational institutions to give explicit recognition and support to the process of skill development, without as yet a clear strategy for how this shall be achieved in the higher education sector.

Outline of LUSID

LUSID (the Liverpool Universal Student Interactive Database) is a system for learners to record experiences and achievements, to audit skills, and to carry out action planning, available over the Web, initially to students in the University of Liverpool. The 'back end' computational engine of LUSID is a database designed to hold information relevant to the above activities, and to constructing CVs, while the 'front end' user interface appears as a series of Web pages which display and allow editing of the information input, or other information supplied by the system such as guidance for improving skills.

The LUSID interface offers the user three sections. In the *Recording* section, users are invited to input details of *experiences* - these may be jobs, periods of study, voluntary work, or other types of experience - and *achievements* - including both qualifications and other things that can be attested, certified or evidenced in some way. Experiences are analysed in terms of the skills used in the experience. The experiences and achievements form the basic information that can later be built up by the system into draft CVs. In the *Skills audit* section, users are invited to note their level of confidence in the same range of skills - the characterisation of skills is discussed below. In the *Action planning* section, there is the chance to record *goals*, which will become achievements when they have been attained, and *activities* which may be necessary to achieve those goals, which will in turn become experiences when they have been completed.

Some details of the system are described below, while the system itself, together with documentation, can be seen at http://lusid.liv.ac.uk/.

Representation of skills in LUSID

There has been much debate over the number and identity of employability skills (see for instance Coopers & Lybrand, 1998; Drew, 1998), but the arguments have centred around the identification of some five to ten broad areas (e.g. communication, teamwork, numeracy). The process of constructing LUSID has suggested an alternative approach: each broad area can be separated into its component skills, and this gives the freedom for

some of the components to occur in more than one broad skill area. The components we have chosen are derived from the current literature from within the education/training establishment about what employers require. We have identified some 5 to 15 components within each broad skill area, which make sense both to LUSID users and to people in the educational and careers communities who debate these skills (Grant & Strivens, 1999). Thus LUSID currently records its users' data in relation to some hundred component skills, which we can envisage growing to a larger total of perhaps about two hundred.

Recording

A user of the initial LUSID prototype can go to any part of the system at any time, but the suggested route for the novice starts with recording experiences. This is because the recording section encourages the user to learn the languages of skills and their definitions in the context of his or her actual experiences. LUSID permits each recorded experience to be analysed in term of skills. The LUSID user is guided through detailed analysis of each skill which is broken down into its constituent parts in the form of questions. These questions, which are referred to as 'canonical skill questions' (CSQs), all start with the phrase "Did you have to ..." for the analysis of experiences. The answers to these questions are simply "a lot", "a little", or "not at all".

To give an idea of the granularity of the LUSID CSQs, some of the CSQs relevant to team working or working with others are (in each case, "Did you have to ...")
➢   recognise other people's feelings when not necessarily clearly stated in language?
➢   work as a member of a team taking your own area of responsibility?
➢   identify your own strengths and weaknesses as a member of the group?

Achievements are recorded in LUSID, but are not directly related to skills. The reason for this is pragmatic. Typically users start by conceiving achievements in terms of qualifications gained, and the majority of nationally-recognised qualifications emphasise achievement in a discipline-related knowledge base (though in fact the learner has almost certainly acquired useful transferable skills in the process of gaining the qualification). The guidance contained within the LUSID system is designed to develop the user's awareness that there are other forms of evidence for achievements besides accreditation (witness testimony, products testified to be the claimant's own, actual performance), and these may in some circumstances impress an employer more than a paper qualification. In LUSID, the way that an achievement is associated with an employability skill is by linking it to one or more experiences where the skills were actually used. LUSID allows such links to be recorded and displayed in a way that enhances the user's appreciation of the relationship between an achievement and the experiences (and related skills) that contributed to it.

Skills audit

Although the system designers regard the recording section as the ideal starting point for the reasons given above, it is quite feasible to go directly to the skills audit section. Users carry out these audits via the same CSQs: but instead of "Did you have to..." the question becomes "Are you confident you are able to ..." Along with these questions, the system shows some summary numbers of relevant experiences they have analysed and considered relevant to those CSQs. It may be worth stressing the point that in LUSID, the audit is of the student's own confidence in relation to his or her own aspirations, and is not intended to have any objective value independently of the student's own appreciation.

Linked from the skills audit, LUSID seamlessly offers the learner guidance relating to the skill in question. This can be in the form of: a more comprehensive explanation of the meaning of the CSQ and the skill area; a guide to better self-diagnosis, either through testing instruments or other means available within an institution; a guide to training opportunities; a guide to appropriate ways of evidencing claims to possess such skills, including accreditation where this exists. Some of these links are to information, diagnostic aids or other resources on the World Wide Web, others can be customised by individual institutions to include notes on the resources and guidance to be found within their institution, whether face-to-face, paper, or computer-based but off the Web.

As well as guidance related purely to the skill in question, LUSID is able to offer guidance dependent on the state of the learner's records within LUSID. For instance, if the learner claims to be confident in some skill, but has not recorded any evidence backing up that confidence, the system may be able to offer (at the learner's request) a suggestion that recording evidence might be useful. At the time of writing, we are exploring how best to formulate and offer this kind of advice.

Action planning

The other major section of LUSID provides a sophisticated aid to action planning, based on the same CSQs. LUSID has been carefully designed so that action planning takes a form very similar to initial recording of experiences and achievements. Goals that the learner wants to achieve are recorded in a similar way to achievements themselves, and the activities that are needed to achieve those goals are recorded similarly to experiences. As well as having the benefit of consistency and thus easy learnability, this means that it is a simple process to 'check off' actions completed and goals achieved, so that they are then moved over to being experiences and achievements respectively, without the need to input the details over again.

Just as achievements can be linked to the experiences that contributed to them, so goals can be linked to subgoals, and to the activities necessary for their attainment. Thus action plans for a particular goal are built up, and LUSID allows them to be of any complexity and level of detail chosen by the user.

The distinction between goals and activities in LUSID parallels the distinction between achievements and experiences. A goal is something that can be broken down into parts, and may benefit from planning; whereas a LUSID activity is something that can be scheduled - it takes time, but its completion does not necessarily result in an achievement. For something to be an achievement in the past, or a goal in the future, there has to be some idea of aiming for or attaining a standard, whether that standard is externally certified, witnessed or attested by another person, or just self-attested.

How does LUSID address the needs identified?

We shall now address the issues raised in the introduction, considering what LUSID offers in relation to the learners' needs we identified.

Awareness of employability skill requirements

The first important contribution that LUSID makes to this is by the existence of the CSQs themselves. Learners may not be clear about the exact meaning of the broad skill area names often used: LUSID conveys their coverage and meaning by breaking them down into their component CSQs. LUSID does not offer users direct access to the sources from which the CSQs were compiled, but they act as a kind of digest of the established knowledge in the field.

While the system does not currently offer any direct evidence that the skills are in fact what employers want, the guidance within the CV section reflects current thinking among careers services and it is intended to include sample application forms from some major employers which clearly illustrate the type of skills and experience they are seeking. This can easily be kept up to date.

Knowledge of levels of achievement

In terms of the discussion above, LUSID takes the first, rather than the second, approach to skills audit. It does not offer on-line tests directly but it does offer advice to users who seek a better assessment of their skills level, and the guidance may refer them to on-line tests or to opportunities to obtain expert feedback. The system does however aim to increase users' understanding of what exactly the skills are, and how to recognise them, through use of the CSQs. The system contains explanations of each of these written at different levels of detail. The learner can test the descriptions against his or her actual experiences or potential work situations in which the skill might be exercised. The CSQs help the learner to appreciate their experience in using a skill, and thus their level of attainment in that skill.

Help with the recording of evidence

The recording section of LUSID allows users to compile a record of their experiences including as little or as much descriptive detail as they wish. They can be viewed and retrieved in chronological order or by type(s) of skills displayed. As noted above, the system uses the broad category of achievements as a data-entry field, asking users to specify type of achievement. A range of options is given including "*formal qualification with*

certificate", "*self-attested*", etc., underlining the message that users may have a variety of different types of evidence for their achievements. Similarly, a series of guidance messages are being developed within the skills audit section, which will alert the student claiming certain skills if there is no record of experiences or achievements related to that skill within the personal data-store.

Help with the process of action planning

The action planning process depends on identifying and scheduling the steps necessary to the achievement of whatever goal is desired. The mechanism currently working in LUSID and outlined above allows this to be recorded, but under development at the time of writing are further mechanisms to facilitate action planning.

In LUSID, when recording goals and activities and linking them together is complete, it results in tree-like structures consisting of a major goal and all of the sub-goals and activities (some of which may already be achieved or completed) planned for its achievement. It will be possible to save these goal structures within the system, and made available to act as templates for other LUSID users.

Any organisation maintaining a LUSID system will be able to construct what they regard as useful templates for action planning. We expect this facility to be a real help for any LUSID user engaged in action planning. Additionally, educational institutions will be able to make available their schedule of course targets, whether term by term or in smaller units, and LUSID users will be able to integrate these schedules into their personal action planning. Variant conceptions of action planning can be worked into the system through appropriate changes to the local version of the LUSID user interface.

Other ways in which LUSID is useful to the individual learner

Whether it be understanding the nature and importance of employability skills, identifying the targets to achieve, or finding resources to help in the achievement of those targets, any Web-based system like LUSID can help the learner by providing convenient links to relevant sources of information, or relevant places where resources may be found. Particularly in view of the rapid development of the Web, printed material quickly goes out of date, and is expensive to maintain. A Web-based system, in contrast, can be quickly and easily updated, and enables virtually instant access to those sources of information, or resources, which are also available on the Web.

The fact that LUSID is implemented entirely on the Web also makes it ideally suited for individual learners physically distant from educational establishments, or whose mobility, lack of mobility, or any other constraints reduce their likely participation in formal educational or careers guidance processes.

Students' perceptions of LUSID

The comments below come from evaluation reports for the Liverpool Universal Student Interactive Database (LUSID) development project. They are drawn from interviews with students participating in trials of the LUSID system at various stages of its development. An early group constituted undergraduates on a Career Management module, and they had little difficulty in perceiving the usefulness of a system which helped them to identify skills they had displayed during various episodes of their life both within their academic courses and in extra-curricular activities including part-time work:

> "... makes you think about, recognise the skills you've got, think about tailoring them to whoever you're applying to for jobs ..."; "the material was helpful, I'd never really thought about the things I did. It's starting on your CV now, isn't it, three years earlier, before you need to"; "... and once you've established what the gaps are I'd like to be able to look for answers. Possibly ask it for some suggestions on how to address a particular weakness" (Davis, 1998)

Summarising, the evaluator felt that LUSID engaged the students well. They saw value in the system in two main areas: support for the process of preparing CVs and job applications; and more generally, helping them to identify areas of weakness and link them through to information about how to improve.

Trialling the system at a later stage, a postgraduate student with considerable work experience felt that the detailed questions about skills contained in the system were a useful indication of the kinds of skills an employer would ask for (Davis 1999).

The data reported above is drawn from students engaged in the process of recognising and developing their "transferable" skills in face-to-face settings with tutors, using paper-based materials and in interaction with a computer-based system. All the evaluation data so far provides positive encouragement that students can recognise the benefits of such processes. The students also provide, with very little prompting, clear ideas and suggestions about the kind of help and support they need in order to get the maximum benefit out of engaging with the process of reflection, recording of achievements and action planning.

Future possibilities for LUSID or other systems

Emerging from the above discussion are areas which relate to the individual learners' needs, but which are not yet covered by LUSID or similar systems:

Direct connection to employers' skill requirements

We noted above that learners need to know what skills employers require, and they needed evidence to be convinced. It would be straightforward, if tedious, to gather together a large set of application forms of the kind that tend to be used by larger corporate employers. A future, more challenging extension of this would be to allow the filling in of employers application forms directly from the information recorded in LUSID. However, this still leaves unresolved the question of the requirements of smaller businesses.

Smaller businesses are widely regarded as a key to economic growth and regeneration, and are often the target of support by various governmental funding schemes. However, some of the smallest enterprises may have no personnel department, and only a trial and error attitude to recruitment. It is much more of a problem to gather information about the skills requirements of these businesses, and it seems likely that a full answer to this problem is only likely to come about in conjunction with other developments in labour market intelligence.

LUSID does, however, offer the potential for future development such that interested employers could enter details of their jobs using the same CSQ skill categorisation as LUSID users' analysis of experiences. An employer could be asked to answer just the same questions, with the phrase "Did you have to ..." replaced by "Will your employee have to ...". This has not yet been attempted, partly recognising that most small business employers do not give a high priority to spending time in this kind of activity, but we are considering potential pilot studies.

On-line testing of skill levels

The effectiveness and accuracy of any form of testing of employability skills is debatable, apart from actual performance on the job. Nevertheless there may be some areas where this approach is plausible. It would be just as easy to incorporate such tests in LUSID as on to any Web site, with the added bonus that the scores could easily be recorded for future reference. However, no such system would, by itself, ensure the reliability of such a test. Even to establish a fair and equal test between different candidates would need the physical and human resources of an examination centre. Thus it is essential that, for on-line tests to be used individually, they be treated as diagnostics under the control of the learner, for the learner's information, not as objective evidence for any other party.

This neatly illustrates the view that real evidence for employability skills is best found through performance in real-life practical situations, which is exactly the approach around which LUSID is based.

Matching of skills profiles to jobs directly

It may be regarded as beyond what is required, but the ideal situation for learners of employability skills interested in employment would be to be directly connected with recruitment services that offer them jobs appropriately matched to their skills profile. While there are several Web-based CV services, or employment

sites with CV services, (UK ones include PeopleBank, 1999; CareerMosaic, 1999; Jobsite, 1999) there is plenty of room for the development of services that would use the richness of information which is able to be stored within the LUSID framework.

Conclusions

The Web-based interactive database approach taken by LUSID is a large step forward to effective support for individual and life-long learners in relation particularly to employability. It supports the awareness of employability skill requirements and knowledge of levels of achievement in related ways, by detailing the components of employability skills so that it is both clearer what they are and easier to judge the level of achievement on each one. It provides a powerful framework for support of action planning, which however will require elaboration, detailed field testing, and development, as well as possibly customisation through the input of action planning goal structures deemed appropriate.

We have also identified important challenges that go beyond the immediately planned scope of our project. Such database systems naturally lend themselves to search and matching, and this could be developed using the framework of LUSID, either to lessen the burden of filling application forms or to play some other part in the recruitment process.

On-line testing is a different matter. There are practical difficulties involved in using a web-based system to gather direct objective evidence of a skill level. Instead it may be better to stay with the principle that this kind of database belongs to the user, and both the process and the product are entirely theirs.

One area which urgently needs further research is to identify factors in both the users and the systems (human or electronic) which facilitate the engagement of the learners in the process. What motivates learners to use such systems is probably the overarching research issue. However, finding efficient means for the identification of skills and evidence is likely to be a factor in users' motivation and engagement, and LUSID's CSQ approach to detailing employability, or transferable, skills offers a starting point there.

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