

User Study Report I

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1. Overview

We present a summary of the initial findings and suggestions from the user survey and pilot interviews. We are currently following up the survey via interviews with selected respondents.

1.1 Summary of Survey Results

- **Use of myExperiment is not always intuitive.** This suggests a lack of generic level of understandability of the myExperiment user interface. Possible factors include unclear information on the website, design of icons, vague languages. We suggest that a further heuristic evaluation be conducted using the guidelines provided in the user evaluation plan document.
- **All respondents said that it is important that there is verifiable evidence that a workflow works as described for them to use any workflow built by other people.** We suggest that myExperiment team should discuss how to improve the quality of workflow descriptions and encourage this good practice.
- **All respondents are concerned about the IPR (and plagiarism) issue.**
- **Most respondents said that they would be encouraged to share workflows they build if a)** They are able to control who can use them **b)** They know who is using them. myExperiment team should improve the information about user profiles. Also, it would be useful for myExperiment to encourage mutual acknowledgement from the users.

1.2 Summary of Pilot Interviews Results

- **The complexity of workflows may deter the users from reusing or modifying them.** While we will continue to explore the socio-technical issues involved in reusing workflows, we think more evidence should be made available about the robustness of a workflows (more detailed descriptions and review of a workflow and services, for example).
- **Some users are accustomed to a modularised approach of building workflows.** It might be sensible to consider supporting the development and sharing of workflow plug-ins. For instance, users can 'shop' for plug-ins for their workflows. While browsing on myExperiment, users might mark the item (workflow) they'd like and put them in their shopping baskets. They can check out these items and assembled these plug-in workflows for their own purposes. Such a collection can also be shared amongst friends.
- **The problem of scale needs to be addressed.** The problem can be seen from two perspectives: a) size of a workflow (when a workflow gets too big and difficult to understand b) an increasing number of workflows available on myExperiment. We think better workflow descriptions and diagrams will help with the first problem but what 'better' means is undefined. We will be following this issue up in further user interviews. To deal with the second problem, we suggest considering how a workflow repository can be structured by: a) metadata (ontology, tags) b) social networks (data mining similar workflows viewed or used by other users). Apart from that, visual representation of the workflow repository according to pre- or user-defined dimensions (e.g., tree of workflows, versioning, personal collection) might also help.

2. User Survey Part I

We have received 6 complete and 1 incomplete (part 3 missing) responses so far. The respondents are from 4 different countries (UK, NL, Sweden and Germany). Their backgrounds are mainly in bioinformatics (biology and pharmacology). Some are newcomers just starting to learn workflow building and some of them are experienced workflow builders who are in charge of building

workflows for their groups. Manchester appears to be a hub of workflow knowledge as the respondents from Manchester claim that more than half of their group members are currently using workflows, while other respondents claim few in their group currently use workflows. All respondents said they expected their use of workflows will either increase or stay the same (mainly for those experienced users), and they also expected that the number of workflows they build will either increase or stay the same (mainly for those experienced users, again).

3. User Survey Part II

3.1 Do you use other people's workflows?

Most of the respondents (apart from the respondents based at Manchester) currently only use workflows built by 1) colleagues in different organisations but in the same project, 2) colleagues outside their organisation and their project, or 3) anyone who is willing to share them. Most of them (again, apart from the respondents based at Manchester) have either rarely or never used workflows built by 1) their colleagues in their group, or 2) colleagues outside their groups but within their organisation. But most of them would be interested in using workflows built by 1) colleagues in different organisations but in the same project, 2) colleagues outside their organisation and their project, or 3) anyone who is willing to share them, and surely 4) colleagues in my group and 5) colleagues outside my group but within my organisation.

This suggests that for all respondents myExperiment is likely to serve as a means to increase sharing workflows with the outside world (i.e., colleagues and researchers in general, within and especially beyond their actual organisation, group or project). In other words, myExperiment can extend users' current collaboration to an international and cross-organisation level.

3.2 Would you be interested in using other people's workflows?

All respondents confirmed that they are interested in being able to find and use workflows built by others because 1) Other people are likely to build workflows that do similar things to what they want 2) They would be able to use them as building blocks for more complex workflows.

Some of them selected other reasons:

- It would enable them to build workflows with their collaborators more easily
- It would be quicker than building their own workflows even though they may have to make changes
- It would help improve the quality of workflows used within their research communities.
- It would enable them to verify other researchers' results more easily

3.3 What are the important factors for you when using other people's workflows?

All respondents said for them to use any workflow built by other people, it is important that 1) There is verifiable evidence that it works as described 2) I can test it for myself.

Some also selected the reasons:

- I know the builder's identity, background and experience
- It has been recommended by a colleague
- It is published in peer-reviewed journals
- It has high number of downloads

They also emphasised the importance of documentation and descriptions of the workflow. Here are two quotes:

“It is well documented (related to testability); It has been tested and rated by colleagues and machines on usability and reliability.”

“The description of the Workflow (or its modules) is sufficient”
This view was echoed in the interview with Bill (see below).

3.4 What would motivate you sharing your workflows?

Most of the respondents said they would be motivated to share workflows they build if 1) It would be good for my reputation and career 2) I think it would be beneficial for their research community as a whole 3) It would make it easier for them to work with my colleagues.

3.5 Is IPR an issue when sharing workflows?

All respondents are concerned about the IPR issue. They said they would be discouraged from sharing workflows they build either by 1) There may be licensing issues over IPR, etc or by the possibility that 2) It might lead to their research might be scooped by a competitor. Some of them also selected 3) There are no convenient or good tools available for sharing 4) They wouldn't be confident of the quality of my workflows.

An additional comment made by one respondent addressed the potential unnoticed credit for workflow authors in stating that in any case it should be referenced by people whose work they have used.

3.6 What factors would make sharing workflows more practical?

Most of the respondents said that they would be encouraged to share workflows they build if 1) They are able to control who can use them 2) They know who is using them 3) They get acknowledgement of some kind (e.g., in a publication) 4) They have a good and easy to use tool to help me (e.g., myExperiment).

4. User Survey Part III

This third part, covering the myExperiment user interface has so far been completed by six of the seven respondents. Each question uses a Likert scale ranging from “strongly agree” and “agree” over “not sure” to “disagree” and “strongly disagree”. The categories at both ends, strongly agree/disagree have not been used by any of the respondents. The results were based on a small sample (6 respondents). We await more data.

4.1 It was difficult in myExperiment to identify people with whom I would wish to share workflows: Three not sure, two agreed, one disagreed.

Most of the respondents found it difficult in myExperiment to identify people with whom they would wish to share workflows.

4.2 It was easy in myExperiment to understand how to become a member of a workflow sharing network: Four agreed, one was not sure and one disagreed.

Not every respondent found it easy in myExperiment to understand how to become a member of a workflow sharing network.

4.3 Workflow descriptions in myExperiment did not provide enough information for me to be able decide which one I might want to use: Three agreed, two were not sure, one disagreed.

Most of the respondents found workflow descriptions in myExperiment insufficient for them to be able decide which one they might want to use. One respondent noted that this would depend on “workflow descriptions added by authors”.

4.4 It was easy in myExperiment to find all the information I would need in order to use someone else's workflow: Two agreed, three were not sure, one disagreed.

Not every respondent found it easy in myExperiment to find all the information they would need in order to use someone else's workflow. It was noted that it was easy because 'at the moment there are not many workflows in there.'

4.5 It was easy to understand how to publish a workflow using myExperiment: Four agreed, two were not sure.

All respondents more or less found it easy to understand how to publish a workflow using myExperiment.

4.6 It is not easy to understand who would have access to my workflows when I publish them: Two agreed, two were not sure, two disagreed.

Some respondents found it easy to understand who would have access to their workflows when they publish them, and some did not.

4.7 The various functions in myExperiment were well integrated: Two agreed, four were not sure.

Not every respondent was sure that the various functions in myExperiment were well integrated.

4.8 myExperiment responded to my actions in a consistent and predictable way: Three agreed, two were not sure, one disagreed.

Not every respondent thought myExperiment responded to their actions in a consistent and predictable way.

4.9 Using myExperiment was intuitive in that it was always easy to understand what I could do and how I should do it: Two agreed, two were not sure, two disagreed.

Not every respondent thought using myExperiment was intuitive. It was noted by one respondent that this could be the case because of some missing functions.

4.10 myExperiment lacks functions I think are important for sharing workflows: Three agreed, two were not sure, one disagreed.

Suggested functions to be added on for sharing workflows: 1) information about services 2) more detailed descriptions of the workflows.

4.11 I would use myExperiment frequently: Five agreed, one disagreed.

4.12 myExperiment would not be widely used in my research community: Five disagreed, one was not sure.

Nearly all respondents said they would use myExperiment frequently, and they all more or less agreed that myExperiment would be widely used in their research community.

4.13 *Other comments*: “It is easy to see workflows and what they do, as there are not many uploaded. Once there are 100s or more, then I think it would be harder to browse/find workflows. Some are also better annotated than others.”

5. User Interviews

Work has begun on follow-up interviews with survey respondents and ‘friends and family’ users of myExperiment. Below we provide an abridged version of our pilot interview transcript with Bill.¹

Date: 23-10-07

Time: 14.00 - 15.30

5.1 *On the nature of workflows*

Traditionally, biologists have to sit at the desk for 2 months and read a lot of literature in order to map the genes, matching pathways and possible disease. And this work has been done manually. Workflows can provide systematic review and are scalable and modular, cutting the research time to 30 minutes in processing the data. Usually still the domain specialist has to help at checking the relevance of the findings at the end of such a process, especially running it for the first time – which still is much faster. Despite these two main advantages, workflows do have some disadvantages. First, workflows rely on external resources; if these resources are not good enough (e.g., low data quality, website not working), the results are wrong. Basically, if you put rubbish in, rubbish comes out. Second, workflows can always break at certain points in the chain (unstable), because a workflow would not work if one step goes wrong. If one resource is not available, the whole thing breaks as it cannot be processed further. Third, workflows rely on other people hosting the databases providing the data and metadata descriptions, rather than yourself (more dependent, and depending on the quality of resources).

Bill said he prefers to develop workflows in a modularised way because it is more difficult to maintain and more likely to break if a workflow gets too big.

5.2 *On activities on myExperiment*

Asked if he would upload each of the workflows he develops to Wallace, Bill said ‘I only put those workflows with descriptions on myExperiment so that people can use them’ and ‘I do versioning. There are 15 versions for this workflow, for example, and some are with descriptions. I only put those with descriptions.’ (Note that so far descriptions have to be inserted from Taverna.)

Prior to myExperiment, Bill only knew a small group of about five people using Taverna and developing workflows (mainly local at Manchester). He now has met quite a few people he did not know before. He knew these people through following up some discussions in forums, or searching the workflows they develop. As Bill’s recent workflows are about text mining and also some of the people he has now met both have developed such workflows, common ground could be found. Although Bill did not use their workflows in the end, he found it useful looking at the way they developed their workflows. Fred’s workflow is too big (problematic to Bill), and it queries different datasets (different methods). So it is not the sort of workflow Bill was looking for. Fred on the other hand has used a part of one of Bill’s workflows, but has not come back yet about the outcome.

Asked if he found the music workflow and Dilbert workflow useful, Bill said ‘It’s nothing to do with what I’m doing. I can relate to those that are doing text mining.’ Bill’s activities on myExperiment very much pertain to his research in his area.

¹ Names have been anonymised.

Regarding his frequency of use Bill stated to use myExperiment at least every two weeks, as a) there are not enough workflows useful to him right now (i.e., in his domain) and b) the building of his own workflows takes time in-between. Asked how he would use myExperiment (finding adequate workflows), Bill said he would start from 1) search for a workflow related to a topic (e.g. 'text' for text mining), 2) look at the pictures of the workflows found – if he considers the size as too big he usually discards using it, because it might be difficult to integrate, 3) choose a workflow and read the descriptions of what it does 4) click to see the chosen workflow, see what tags, services and resources it uses (e.g. the box for an external service is green in Taverna). This step involves a deep level of domain knowledge and community knowledge gathered from using Taverna. Experienced Taverna users know what resources and services are used in a workflow once they see those abbreviations and the colour of boxes shown in a workflow. 5) download and use it.

5.3 on the functions of myExperiment

Bill found the feature of rating a workflow meaningless, because the person who rates should explain why s/he rates this workflow high/low, especially due to the rather complex concept of workflow. Otherwise it's just randomly quantifying one's preferences or expressing a conflict of interests e.g. in rating a competitor's workflows low. Bill would like to have something like the Amazon customer review for books, films and other items, i.e., a space where users can insert their comments. In this way users could explain the reasons of their rating, may it be the resources or services used in a specific workflow are good/bad, etc. A qualitative measure is needed to complement the quantitative one.

The development team is thinking of making workflows shared on myExperiment operable at least on both Kepler <<http://kepler-project.org/>> and Taverna (right now only Taverna workflows can be found). From what Bill has told us, Kepler functions differently from Taverna (different diagrams, layouts, iteration strategies – Kepler functions iterative in loops instead of completely linear like Taverna). Even the way of displaying the workflow differ: Kepler shows a workflow from left to right horizontally, while Taverna shows a workflow from top to down vertically. It would be a problem for users from different user communities to judge which workflow to choose as well (because they have community knowledge internalised, e.g. Kepler might re/present resources/services differently).

In addition to the above mentioned issues, Bill's wish list also includes a personalised tag cloud (e.g. Del.icio.us, CiteULike). He states to find the public tag cloud helpful and to use it a lot, but a personalised version would be even more beneficial for using myExperiment.