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Creating Digital LAM Content for Schools: Modelling User Involvement in Multi-organisational Context

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Abstract. Public services are usually created in a network of organisations, meta-organisations that consist multiple actors with variety of capacities. Managing work in meta-organisations face unique challenges due to multiple stakeholders with different understandings of the tasks. Management of the work requires shared base understanding of contributions needed from multiple stakeholders and for many tasks, this is not yet properly understood and modelled. User-centred design, even it supports well multi-disciplinary development of systems and services with multiple actors and can be applied to ascertain a balanced outcome from the design work, is one of these areas that lacks this understanding and requires further modelling. Typically, user-centred design responsibilities are set in a public organisation who creates the digital service platform. Through our case on creating digital library, archive, and museum (LAM) content service for schools, we study how user centred design activities happen outside the platform provider organisation. More specifically, we study how the content creation organisations can utilise the expertise of a teacher and identify how this expertise can be incorporated in content creation organisations. Based on our findings we form a tentative model for user involvement in meta-organisations (UIMO) which aims to formulate a structure for the user-centred design responsibilities in networked environment.

Keywords: Human-centred design · user involvement · inclusive design · design networks · meta-organisations · Public Value Management

1 Introduction

User-centred design is acknowledged as a recommendable approach for digital product and service creation with an emphasis of involving stakeholders, especially end users, in the design process [1]. Similar thoughts have been raised for creating public services under the term co-production [2, 3]. In Finland, public administration has provided official guidance for including user-centred design activities in online service design and development [4].

The Public Value Management doctrine emphasises that public services are produced in a networked environments and that it is important to pay attention to managing the division of work between organisations [2, 3]. With networked environment we refer here a network of independent public organisations producing common services in coalition i.e., in meta-organisation. However, there is not much attention to the division of work and tasks between organisations in the network. Public sector has received criticism that its guidance focuses only on requiring user-centred design in platform acquisition and procurement [5], but not in the content creation stage.

Libraries, archives and museums (LAM) organisations know how to use cultural heritage materials to support learning [6, 7, pp. 91–133, 8]. However, they have received criticism about not listening to the needs of schools and not connecting the content to the national curriculum [9]. The user-centred design approach can address this through the inclusion of teachers, the end-users of the service.

In this paper, we use the Finna Classroom service pilot as a case study. We address both types of criticism that the digital public service production as well as the LAM organisations have received. We pay attention to including user-centred design activities outside the actual platform creation, including the content design phase.

As the outcome, we form a tentative model for organizing user involvement in a national level meta-organisation for producing cultural heritage content for education. We present our experiences from the practical case of creating Finna Classroom and emphasise activities that do not typically take place on the platform development side but in the participating content specialist organisations.

The Finna service is an example of public digital service produced in a network of libraries, archives and museums. At the time of the study 2019, the Finna Classroom was a new type of educational LAM content service for schools that broadened the contributions of the national Finna.fi digital library. The platforms parts of the Finna Classroom are created by one organisation and the content comes from multiple organisations.

Our approach aims at making it easy for participating content producer organisations to involve a teacher in the design process. We examine how the digital service development projects utilised the opportunity to include the teacher in the process. We aim to understand what human-centred design activities should happen outside platform creation.

Based on the previous framing, the main research question for this paper is: *How to model and coordinate digital LAM content creation in a user-centred multi-stakeholder (meta-organisation) project?*

2 Conceptual Background

2.1 User-Centred Content Creation

Public service development emphasises the need for co-production [10–13]. Co-production can refer to a range of activities [10]. We focus only to the participative co-production i.e., to empowering users to participate in the design of future services.

Principles and processes of user-centred design appear in ISO-9241–210 [1]. There are several aligned design processes, too: Contextual design [14–16], Goal-Directed

Design [17–21], Scenario-based Design [22], Lauesen’s User Interface Design [23] and the Usability Engineering Lifecycle [24]. Following the principles of user-centred design [25], all models start from researching users, analysing the data, and compressing the results into visualisations [14, 17, 18, 22–24]. Mayhew [24, p. 5] distinguishes between processes that are meant for a clearly defined starting point and processes that are meant for innovating new products. The ones for clear starting point utilize lighter user research. ISO 9241–210 [1] acknowledges this variability; projects can start from different levels and user-centred design activities can be applied in project-specific manner. All models include iterative UI design, an implementation phase [14, 17, 18, 22–24], and evaluation with users. In their process models, Mayhew [24, pp. 1–16] and Lauesen [23, pp. 44–45] explicitly mention taking the product into production and with feedback gathering and usability testing. However, the processes are typically made for digital product creation, and they don’t acknowledge e.g., that there is more generic concept creation for content platform and then each content provided through it can be its own information product created separately.

The need to include customised content for different users according to their needs is typical in content creation processes. Also, writing and structuring content consistently is a similarly important process requirement, as well as content assessment, where one determines how the users will benefit from the specific content. Examples include Kostur [26] and Carliner [27] in the field of information design, Kwahk et al. [28] in health and medical information, and Blythe [29] in university online course content.

Carliner [27] proposes using an information design model that contains three levels: physical (ability to find information), cognitive (intellectual), and affective (emotional). Carliner’s [27] framework contains information product specific business and user need research, setting requirements based on research data, designing the information product against those requirements, and evaluating the created product with the users. If you would apply ISO 9241–210 [1] purely to content creation, this would be in line with the recommendations of the standard.

2.2 The Impact of the Networked Nature of a Meta-organisation for Design Activities

The networked nature of service production has been acknowledged on the private and public side for already over a decade [30, pp. 93–117, 32, 33, 2, 3]. User-centred design processes and participative methods have been suggested as tools for organisations to coordinate their work [31]. However, regarding the user-centred design processes, all models seem to assume that the design work is done inside one organisation, which includes stakeholders in its design process and gives them the opportunity to affect it.

The specific focus of this paper is on meta-organisation. Meta-organisation is a network of organisations lacking the formal authority that would arise from employment contracts [32]. For meta-organisation it is critical to pay attention how individual organisations work together and how they divide and allocate tasks between organisations [32, 33]. Also, The Public Value Management (PVM) doctrine acknowledges the governance of public services and the need to manage the networked nature of public service creation [2, 3].

PVM's stance on efficiency is to check on a continuous basis that the activities fit the purpose and, with regard to its stance on accountability, to negotiate the goal setting and responsibilities within the network of stakeholders [3]. The principles of human-centred design (user research and testing) support checking that the activities are fit for the purpose.

This does not seem to be visible in the current discussion: how to apply human-centred design processes to public digital service development in meta-organisations?

3 Context of the Study, Data and Methods

3.1 Context of the Study: Creating LAM Content for Education

Our research environment, the Finna service, is a shared digital interface for Finnish LAM organisations [34]. The Finna coalition (of member organisations) fits into the description of a meta-organisation: the participants for the development of the platform and its content come from several separate organisations. The Finna team of the National Library of Finland (NLF) does the platform development, but the content comes from all LAM organisations. They are separate organisations with separate management, bound together only by signed agreements with NLF that define the outlines of their responsibilities [34]. The final outcome is not a result of the work of only one organisation, but all of them. The Finna coalition is a significantly sized meta-organisation, since practically all Finnish libraries, archives and museums are prospective partners through the Finna coalition [34, 35]. The Finna service was first launched in 2012 and at the time of the study in 2019 it already had over 300 libraries, archives and museums delivering content through the platform [34, 36].

The website and service Finna.fi is the national search interface for all the materials provided by the Finna member organisations. The Finna service interface is directly integrated into the collection systems of the Finnish LAM organisations. A user can directly search the scattered books, articles, images, documents etc. based on their meta-information. At the time of the study 2019 The Finna Classroom service was a new type of service addition to the Finna service family: the produced content offering for schools was built on top of Finna.fi content. It offers a national interface for Finnish LAM organisations to deliver curated and produced content for schools, and for schools it offers ready-made LAM content packages that are attached to the national curriculum.

3.2 Process and Participants

The starting point of the research was the beginning of the content creation pilot when focus of the work moved to the content provider organisations. Before the study phase, Finna team had formed the assumption that the Finna.fi website does not currently properly fulfil the needs of teachers and schools. Their work had started from user research and included co-innovation workshops with content-producing LAM organisations. Based on this, the project narrowed down to the Finna Classroom service concept and decision to pilot it with a small number of LAM content providers was made. Basically, the concept idea was created by following principles of user-centred design and co-creation on platform activities side and thus following current theory and recommendations.

The participating LAM organisations were Finna content provider organisations. Finna team recruited participating content production LAM organisations with two methods. First, the idea of the pilot/experiment was introduced in events targeting Finna customer organisations. Second, the Finna service directly invited handpicked customer organisations to participate. The aim was to cover libraries, archives, and museums, to select organisations that are likely to have materials of interest to schools at the national level. Still, there was the intent to select organisations of different sizes and with a different focus in their collections. Additionally, the intent was to include organisations covering minority cultures. In the end, there were seven content creator organisations: 1 library, 2 archives, and 4 museums. The library and two of the museums were bigger including the number of staff. The two archives and two museums were small with focused collections having also smaller staff. One of the bigger museums had a staff member with teacher training and the library curator had pedagogical education, but he worked with university students. With the selected organisations, the pilot was focused on cultural heritage content.

The User Involved into the Pilot was a Teacher. In the context of schools, the users would be pupils and teachers. We assumed that, in practice, the teacher is the gatekeeper who has the biggest impact on making the decision on how and which parts of the materials will be used. Since the pupils are minors, working with them would require additional consent agreements with their parents. We concluded that as the first step, we would involve teachers in content creation. Involving pupils would be an advanced step and can be taken after the first stage has progressed sufficiently. Our aim was to lower the threshold of involving a teacher in the content design activities and observe how content creation organisations would utilise the opportunity to interact with the teacher, map the activities to existing user-centred design and gather understanding whether it would matter were the UX work would have been done. For the duration of the study, Finna team hired a history teacher to be available for contact.

Information exchange and collaboration points between the teacher and the organisations are visualised in Fig. 1. The NLF Finna team agreed with each pilot organisation that they would curate a material packet from their own materials for schools. Possibly, they could also ideate readymade pedagogical ideas on how to utilise the material in education. Should the pilot organisations not create the pedagogical ideas, the teacher would be there for that task.

The Finna team had separate 1.5–2 h long kick-off meetings with each of the pilot organisations. In the meetings, they were introduced to the details of the Finna Classroom service and they were given a short introduction on how to curate materials in the Finna.fi website. They were able to ideate with the history teacher about the part of the curriculum the materials would fit, what focus in the materials would bring value for education, and what type of material is acceptable to children. This part became the place for organisations to perform the initial user research in the form of interviewing the teacher.

During the content creation phase, the pilot organisations could contact the history teacher anytime to ask for further consultation. There were two variations of this. 1) The organisations created both the curated material package and utilisation ideas themselves and asked the opinion of the teacher. At the end, the teacher did an informal review of the material set. 2) The organisations curated the material package themselves, but the

teacher created the utilisation ideas. First, the organisations curated the material package and asked for teacher’s opinions. In the end, the teacher did an informal review of the materials and created utilisation ideas. When needed, the teacher asked for opinions and clarifications.

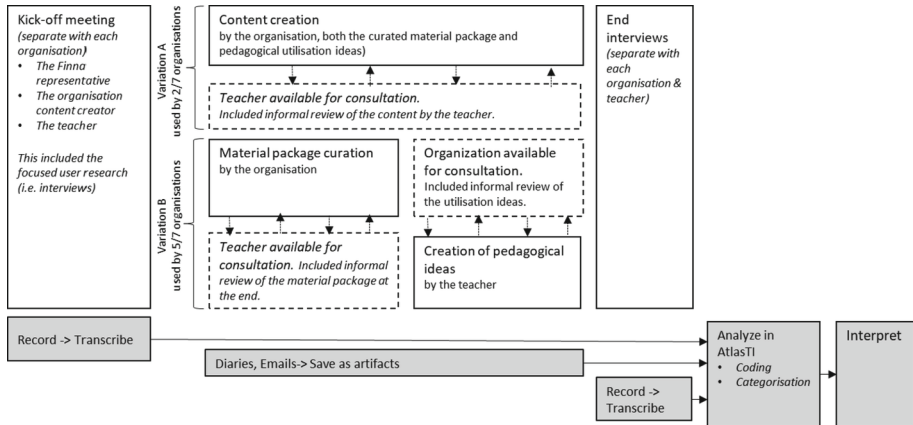


Fig. 1. Data points of information exchange and collaboration, data collection methods and analysis

3.3 Methods

The data collection methods were a selection of qualitative data collection methods. The kick-off meetings were recorded and the free discussions between the pilot organisation and the teacher were transcribed. The pilot organisations were asked to keep a diary on topics or situations where they wanted to consult the teacher. Two of the pilot organisations returned the diary sheet. Emails between the pilot organisations and the teacher were saved for analysis purposes. Both diaries and the emails were anonymised.

After the pilot, the teacher and six out of seven content creators were interviewed. The duration of the interviews varied between 15–30 min. The interviews were recorded and transcribed, and as part of the transcribing process, the identifiers of organisations and names were anonymised. The interviews with the pilot organisations were half-structured with pre-set themes. However, the discussion was free, and it allowed exploring emerging themes as well. Initially, there were five pre-set main themes: selecting the topics of the material packets to be created, creating the content for the material packets, creating readymade pedagogical utilisation ideas, using the Finna.fi website as a curation tool, and general feelings after the pilot. The underlying subtheme related to most of the main themes was: in which parts did they use the opportunity to contact the teacher? During the third interview, arising from the content, a subtheme emerged; was the nature of the materials such that it risked creating a distorted or too stereotypical image of the past if handled wrong? This was systematically included in the rest of the interviews. The interview with the teacher was also half structured to allow interesting

subthemes to emerge. The main theme was only how the work proceeded with each of the organisations.

The data analysis methods followed the five-step process that Renner and Taylor-Powell [37] describe for analysing qualitative data: 1) Get to know one's data by reading through /listening to it several times. 2) Focus the analysis, 3) Categorise information, recognise the themes and patterns and organise them into coherent categories that can be pre-set or emergent, 4) Identify patterns and connections within and between categories, and 5) Interpret findings. The transcribed recordings of the kick-off meetings and the interviews and the emails were analysed with Atlas.ti software.

4 Results

The research was focused to the parts of the material that involve the teacher in the content design. These include relevant parts of the transcripts of the kick-off meetings, emails between the pilot organisations and the teacher, and parts of the end interviews that illustrate how the interaction worked out. The material was tagged initially with 140 codes according to *small themes* emerging in the dialogue. 71 codes used for other purposes. Eight used for profiling organisations. 56 that were analysed in this study. The 56 codes were grouped further into 15 slightly larger categories (later referred to as *subcategories*) and even further three larger categories (later referred to as *categories* that all emerged from the materials.

The first category was the information that is useful to all organisations regardless of the topics of their collections (later referred to as *General information*). The second category was information that was relevant only in the context of the collections of the organisation (later referred to as *Unique dialogue*). The third category was that *Materials might have features that make contact with the teacher even more important* (e.g., such a feature could be that they are about minorities).

The General information was information that could be useful to any organisation producing materials packets for history teaching. Capturing this type of information during the pilot helped Finna team to create general instructions for all the future content-producing organisations. It consisted of four smaller subcategories:

1. Information about national curriculum
2. Practical realities related to teachers' work and how it affects what they want from extra materials
3. Instructions to consider when adding information into a material packet
4. Points to consider when selecting individual materials for a material package.

Timing wise it was practical to collect during creation of the first content products (i.e. during the pilot). It would have not mattered which organisation gathers that information, as long it was gathered a cross the first content production creations and distributed to every content producer org, but the platform provider organisation's orchestrator type of role fit for this.

The Unique dialogue category meant unique interaction topics between the teacher and the organisations that made sense only in the context of the collections of the pilot organisations, i.e., information that cannot be translated into instructions relevant to all organisations. This needed to be done separately by each content provider org.

Even though the discussion was collection-specific, the purpose behind the discussion topics had similarities between organisations. There were three different purposes that emerged from the discussion, and they reflected the phase the content creation was in. The first *purpose* behind the unique dialogue was the *initial finding of the context of use of the information product, related usage needs and limitations*. The second was the *informal review of the curated material package* and the third was about *creating the pedagogical utilisation ideas*.

The initial finding of the context of use of the information product, related usage needs and limitations was information product specific business and user need research. This purpose further split into six different narrower information topics to seek out:

1. List topics in order to recognise which interests the teacher (initial narrowing down of topics)
2. Identifying the connection (of the initially narrowed down topics) to the curriculum and finding an interesting angle to complement typical schoolbooks
3. How teachers would use the materials related to a particular topic in teaching, including possible cross-subject usage
4. Which topic or subtopic would especially benefit from extra materials (in addition to schoolbooks)
5. Delimiting criteria for the materials
6. Materials unsuitable for children/school

All the organisations first looked for help in selecting the most interesting collection topics by listing their existing collection themes to quickly identify which interested the teacher. The teacher discussed with all, how the interesting collection topics connect to the national curriculum. With 3/7 organisations, the teacher also discussed how they could in practice utilise the materials in teaching; one organisation representative who had very recently studied the pedagogy of teaching history themselves mentioned that they had considered this while selecting the materials for the package. With 4/7 organisations, there was also discussion about the potential usage of the materials for cross-subjects: e.g., same set of materials could be useful for all history, Finnish, and art education. These two topics were combined into one subcategory: How teachers would use the materials related to a particular topic in teaching, including possible cross-subject usage. Also, 4/7 organisations spontaneously found topics about which the teacher mentioned that it would be “*really good to have extra materials related to it in addition to schoolbooks*”.

Going through these information topics helped all the organisations to direct their content creation work to topics potentially bringing the most value for schools. Once the most interesting themes were identified, 5/7 organisations used the opportunity to discuss with the teacher what criteria to use in narrowing down the amount of materials. The museum with the content creator who had recent pedagogical studies mentioned using their training in narrowing down the materials.

2/7 organisations had worries that certain types of materials might be unsuitable for children for different reasons (e.g., funeral pictures or propaganda-type material, or the content being just text e.g., letters). Concerning all these worries, the answer was that the ages of the children need to be considered, but as the materials can be very interesting

especially for teaching high school aged children, it was much better to ask and not just leave the material unused just in case.

All the organisations looked help to find most interesting collection parts, but discussing how well the topics of the collections matched with the curriculum topics brought in clear differences in the more detailed focus of the discussion. 2/7 organisations had collections that were easy to connect with a topic from the national curriculum already on the heading level, e.g., a collection related to a particular war. These topics are frequently spotlighted at schools and schoolbooks have lots of material related to them. Discussion with these topics were related to finding a particular subtopic that is not covered well in the schoolbooks, but which would bring additional value for the teaching. Not many organisations had these types of topics in their collections. Much more common was that the organisation had collections that on the topic level were not mentioned in the curriculum, but in discussions with the teacher, it was identified that some of the collections are directly connected to a curriculum topic. These topics could very well be subtopics that are not that well covered by the schoolbooks and could bring additional value for the teacher. With these types of themes, the dialogue between the teacher and the organisations focused on recognising the connections to the curriculum and identifying the additional angle that they could bring into the teaching.

Lightweight user evaluation was used by all the organisations. The curation work, writing introductions and adding additional information to the materials was rather straightforward for the organisations once they received rough guidelines on what was expected from them. This did not require contact with the teacher. The unique interaction found in this phase was at the end of the phase when requesting a review of the created materials. The teacher reviewed all the created material packages. Additional materials to the package were proposed for 3/7 organisations originating from the organisation's own materials or via shifting materials from one package to another to make them more versatile for schools. One of the three organisations were such that they had their own pedagogically trained staff member and others were such that the organisation didn't have one available. This dialogue with the teacher could be seen as informal user evaluation of the content.

Creating readymade pedagogical ideas brought out the biggest differences between organisations, the third purpose of having a dialogue with the teacher with how to utilise the packet as part of the teaching. Only 2/7 organisations created the ideas themselves. The two organisations that made the pedagogical utilisation ideas themselves were the ones with content creators that had pedagogical training themselves, and for them this combined with the content creation phase.

Some of the Materials Contained Features that Created a Risk. At this stage, it was possible to identify additional profiling features from the material: features that created a risk that, if used carelessly, instead of deepening learning, they could create a distorted picture of the past. In summary they were:

1. Materials related to a minority (e.g., indigenous people) or an otherwise defined group of people (e.g., working class)
2. Materials that were historical propaganda material (e.g., war time materials meant for influencing home front attitudes)

3. The collections of the organisation were rather small, or they had digitised only small portion of their collections

Three organisations had material that was related to a minority or an otherwise defined group of people. In two of these cases, there was a worry that, if not approached properly, the material could create a distorted picture of this group and emphasise stereotypes, but if used with care they could enrich the education and e.g., make the minorities visible. Similarly, in two of the cases, the material was historical propaganda material, exactly the type of material that brings opportunities to teach source criticism and skills to interpret such materials, but if used carelessly they can create a distorted image of the past. These risky cases overlapped somewhat.

Altogether 4/7 organisations (three of these were smaller organisations, one bigger with their own pedagogical staff) had this type of risky material and half of them felt (all smaller organisations) that it helped a lot that there was the possibility to discuss the image created by the material package with the teacher. Even further, they felt that creating readymade pedagogical utilisation ideas together with the teacher helped to guide the usage into a good direction. Two of the organisations mentioned themselves that either their collections are rather small or that they have digitised only a small portion of their collections. One of them consciously compensated for this and themselves additionally used other available materials in the Finna.fi service from another organisation to create a more varied packet. The teacher also proposed for the three organisations to add a few available materials from other organisations into their material packages to make them more versatile.

By its nature this information was also general and useful to all the content creation organisations in form of check list of typical risk factors. Preconisation of it benefitted from pilot phase where findings were extracted.

5 Discussion

In this chapter, we initiate the formulation of the tentative model for organising user involvement in the creation of digital LAM content service for schools.

Based on the current ISO standard [1], existing process models (Contextual design [14–16], Goal-Directed Design [17–21], Scenario-based Design [22], Lauesen’s User Interface Design [23] and the Usability Engineering Lifecycle [24]) and Finnish recommendations for Design and Development of Public Online Service [4] we take as the starting point that platform development of a new digital service and implementation should follow user-centred design processes. The process can roughly be simplified to five phases: Research, Innovate & Problem scope, Design & Testing, Implementation and Follow-up. User involvement should happen at least in Research and Design & Testing phases. This is visualised in Fig. 2 bottom layer. This was not focus of this research, even though the earlier phases in Finna Classroom work had followed this. This matches also the traditional view what user-centred design activities should include when not counting the nature of meta-organisation and networked nature of the work in it.

Carliner’s [27] framework suggest that also on information product design phase there should happen user-centred design activities that can be simplified to three phases

Research, Information product design and evaluation and Deliver. Similarly to platform creation, user involvement should happen at least in Research and Evaluation phases.

Based on our findings in these user-centred design activities happened unique dialog that made sense only in the context of the collections of the individual content provider. This would suggest that these activities need to be done by the individual content provider organisations individually and cannot be combined to any general user-centred design activities done. e.g. by platform provider organisation. However, our findings also suggest that at this point very light research with just one end user made difference. In our opinion, this suggests that if in the platform concepting phase has been done wider user research, per information products it is enough to do just light additional user involvement. In content services new information products are created continuous basis, so also these activities should be done continuous basis by the particular content provider organisation who happens to be creating new information product for the platform.

Our findings brought two clear differences compared to Carliner's [27] framework. The first difference was that there was also general information, useful to all content provider organisation, to be found during the pilot phase. For identifying this information, it was useful that one researcher was following initial user research done by the first content creator organisations and extracted general information that could be translated to general instructions and checklists for all the organisations. Based on this we would suggest that, when creating a new content service, a pilot content production phase is useful where platform developer follows initial user research done by the content provider orgs and extracts general information and forms general content guidelines for information products.

The second difference was that related to creating education LAM content for schools. Based on our findings for most LAM organisations (the ones without their own pedagogical resource) the work in practice was divided in two phases: the curation of the material package and creating additional pedagogical utilisation ideas. The latter required pedagogical expertise and in practise heavier involvement from the teacher.

Our pilot set-up was such that the user-centred design was "prototyped" by hiring a teacher for the duration of the pilot to be available contact. Our assumption was that once that it was recognised in more detail where and how it would be important to include teachers into the process, it would be possible to create more sophisticated process proposals that could be based on volunteer participation. Including a teacher whose role is to entirely write the utilisation ideas and hand them to the organisations to publish with their material packets turns into a lot more than just lightweight volunteer participation in a user-centred design process. A specific task requires adequate resourcing. So based on this study we cannot recommend one particular method for teacher involvement for this phase.

However, we do not recommend take the easiest approach and focus only curating material packages. Since among general findings one of the things that came up on dialog between the teacher and the content providers, teacher in general wished for pointers how and from which angle to approach the materials. Additionally concerning topics with a risk of accidental misuse, the readymade utilisation ideas are useful for guiding teachers to use them correctly. So we believe that this is important step, even based on

this study we can not recommend exact methodology, we still have made it visible in the tentative user involvement model.

The adaptation of Carliner’s framework as described is visualised in the Fig. 2 in the middle layer. We recommend using pilot phase where in the initial user research phase there is also included cross topic studies to capture also available general information. But after the pilot phase, each content provider org should independently do light user involvement when they are creating information products. We also recommend separating creation of teacher expertise requiring extra materials into separate phase where heavier user involvement is used.

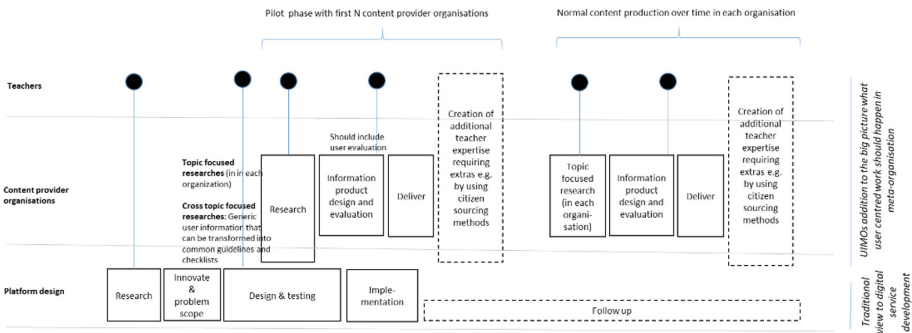


Fig. 2. Integrated process model of The User Involvement in Meta-organisations (UIMO) for educational content service creation.

5.1 Reliability and Limitations

The tentative UIMO model was created in the context of Finland level meta-organisation, Finland specific cultural heritage content and Finland specific curriculum. We would expect that it could be applicable similarly on national level context in other countries as well. However, it is likely that our study does not capture the complexity of international meta-organisations. For example, on producing the Europeana website there are at least the platform provider organisation (continent level aggregator), country level aggregators and then the individual content provider organisations in each country [38].

It is likely, that the specifically resourced history teacher in the project, lowered the threshold to contact the user. For our particular pilot this characteristic was desirable, but it introduces two limitations. First, the results best reflect content produced for history teaching. Second, based on this study alone, we cannot recommend any exact methods to be used to enable teacher participation, especially when it comes to tasks taking more time and effort from the teacher, e.g., the creation of pedagogical materials.

Another minor limitation in this study relates to the non-neutral researcher (being a member of the NLF Finna team). It is not likely that this created a major impact, the focus was on the interaction between the content-producing organisations and the teacher.

5.2 Proposals for Future Work

It would be interesting to enhance the proposed model regarding the creation of pedagogical ideas for curated material packages. Crowdsourcing could be a one direction. Reasons like, organisations do not have the knowledge to solve the problem internally or that the crowd is large and some members are motivated to solve the problem, add probability of an organisation to use citizen-sourcing [39]. Nam [40] lists two citizen-sourcing methods, contests and collaborative websites as sourcing strategies for collecting professional knowledge. Another approach would be experimenting on e.g. on municipality level wider co-operation between city museums and local schools and allow local teachers to use bit of their working time to contribute their working time for this type of work. Osborne [41] has remarked that there are fundamental differences between private and public services that need to be taken into consideration when applying service-dominant logic to public services. One of the differences he lists is that a user can receive two public services that, in a joint offering, define what the final experience will be. In this case the experience of a student depends on how well the two education services provided by the school and the LAMs work together. Furthermore, other public services could have common interests: teacher training, for instance, could potentially utilise this type of educational material service and, at the same time, contribute to it.

It would be interesting to verify further the applicability of the model in cultural heritage domain: applicability in other countries, applicability when producing content for other target audiences than education and, perhaps even, study the applicability of the model outside cultural heritage domain such as health care.

6 Conclusions and Recommendations

In this article, we have analysed the process of co-creation, in which the first Finna Classroom content entities were produced. To support content creator libraries, archives and museums we integrated a representative of the user, a teacher, into a project producing first content packages to the Finna Classroom service pilot. Along observing their co-operation, we examined the research question: *How to model and coordinate digital LAM content creation in a user-centred multi-stakeholder project?*

Our outcome of this process is a tentative UIMO model for User Involvement in Meta-Organisations, see Fig. 2. The foundation of the model presents the traditional view of user-centred design activities taking place in digital service development. Our findings identify additional activities that should happen in the content provider LAM organisations during the content creation phases and thus add complementary structure to the traditional view of the user-centred design when considering responsibilities in meta-organisation. Our UIMO model emphasises the role of the follow-up phase that has been weak in traditional development process models. This emphasis may serve to reveal new dependencies for consideration in future development of digital LAM platforms and content creation.

In preparing for the creation of content for digital services, we recommend careful identification of participant-specific responsibilities and tasks, and careful coordination and alignment of the tasks with the overall process. Also a pilot phase is of importance: collaborative exploration of cross-content topics to generate findings on general

observations of needs of the schools that can be translated into general instructions and checklists. Furthermore, according to principles of user-centred design, prior to making new content available to the public, we advice each actor and organisation doing content production to perform lightweight user testing per each information product they create.

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