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# Makerspaces in the Early Years

Current Perceptions and Practices of Early Years Practitioners, Library and Museum Educators and Makerspace Staff

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Cite as:

Lahmar, J., Taylor, M., Marsh, J., Jakobsdóttir, S., Velicu, A., Arnseth, H.C., Blum-Ross, A., Dýrfjörð, K., Gissurardóttir, S., Hjartarson, T., Jónsdóttir, S.R., Kjartansdóttir, S.H., Kumpulainen, K., Mitarcă, M., Ólafsdóttir, M.E., Pétursdóttir, S., Sandvik, K., Thestrup, K. and Thorsteinsson G. (2017). *Makerspaces in the Early Years: Current Perceptions and Practices of Early Years Practitioners, Library and Museum Educators and Makerspace Staff*. University of Sheffield: MakeY Project.

This survey report has been produced as part of the following project:  
Makerspaces in the Early Years: Enhancing Digital Literacy and Creativity (MakeY)

<http://makeyproject.eu>

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This project has received funding from the European Union's Horizon 2020 Research and Innovation Programme under grant agreement No. 734720

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# SECTION ONE

## INTRODUCTION

The MakeEY project explores the place of the rising ‘maker’ culture in the development of young children’s digital literacy and creative design skills. Research projects are being undertaken in seven EU countries (Denmark, Germany, Finland, Iceland, Norway, Romania, UK) and the USA in which staff working in makerspaces (including Fab Labs) are collaborating with academics to identify the benefits and challenges of running makerspace workshops in both formal (nurseries and schools) and informal (museums and libraries) educational settings.

A survey was undertaken of early years professionals, including teachers, staff working in museums and libraries, and makerspace staff to identify what current understanding and practice is with regard to the use of makerspaces. The survey was developed by the project team and placed online using Qualtrics. The survey was translated into the languages of countries participating in the project: Danish, German, Icelandic, Norwegian and Romanian. At a later stage in the project, the survey was translated into Portuguese and Spanish, for future use. The survey was promoted through the use of Twitter, Facebook, email invitations and relevant listservs.

In total, there were 881 respondents to the survey, but the number of people completing survey questions was lower, at 633. This may be due to the fact that this is an emerging area of research, and people may have been interested in the questions that were posed, rather than wishing to respond to them. It is recognised that the survey is not representative. It is unbalanced in terms of the numbers of contributions from different countries, and given the number of people working in these areas, it cannot be said to reflect the views of those sectors. Nevertheless, the survey offers insights into the views of the respondents with regard to current knowledge and practice in the use of makerspaces in the early years.

A descriptive analysis of closed-format questions was undertaken using IBM SPSS. Open comments were analysed inductively using thematic analysis (Braun and Clark, 2006). Ethical considerations

were paramount. Respondents were made aware about the aims of the study and information was provided about how the anonymised data would be used.

A copy of the survey questions can be found in Appendix I.

Responses were recorded by respondents based in 26 different countries (see Table I).

**Table I: Survey responses - country of origin**

	Count	%
Andorra	1	0.2%
Australia	4	0.6%
Canada	3	0.5%
Croatia	1	0.2%
Denmark	55	8.7%
Finland	6	0.9%
Germany	1	0.2%
Greece	1	0.2%
Iceland	254	40.1%
Indonesia	1	0.2%
Ireland	2	0.3%
Latvia	1	0.2%
Mali	1	0.2%
Malta	1	0.2%
Netherlands	2	0.3%
Norway	9	1.4%
Poland	1	0.2%
Portugal	4	0.6%
Romania	164	25.9%
Slovenia	1	0.2%
Spain	3	0.5%
Switzerland	3	0.5%
United Kingdom	80	12.6%
United States of America	26	4.1%
Germany	7	1.1%
Switzerland	1	0.2%
Total	633	100.0%
Q52		

The majority of responses were from early years practitioners, as can be seen in Table 2.

**Table 2: Respondents' Roles**

		Count	%
Which of the following best describes your role?	Early years practitioner	405	62.7%
	Library professional	162	25.1%
	Museum practitioner	42	6.5%
	Makerspace staff	37	5.7%
	Total	646	100.0%
Q2			

Early years practitioners and library and museum staff were asked if they had heard of makerspaces prior to completing the survey. In total, 63% of respondents were not familiar with the term. This differed according to profession, with the majority of museum (67%) and library staff (58%) having heard of makerspaces, whilst only 25% of early years practitioners stated that they had done so, as seen in Table 3.

**Table 3: Previous knowledge of makerspaces**

Count		Library professional	Museum practitioner	EY staff	Total
Had you previously heard about makerspaces before today?	Yes	93	28	100	221
	No	67	14	300	381
Total		160	42	400	602

Given the differences in experiences of, and familiarity with, makerspaces prior to completing the survey, the following sections consider the responses from each professional group in turn.

# SECTION TWO

## EARLY YEARS PRACTITIONERS

As outlined in the previous section, 75% of early years practitioners reported that they had not heard of makerspaces prior to completing the survey. Those early years practitioners who had some knowledge were asked what they understood by the term. Overall, those who previously had heard about makerspaces showed a good knowledge of what a makerspace is, although the answers varied greatly in length and complexity, some of them proving quite an in-depth understanding of the culture of sharing, the ideology of open-sources and the economical reasons behind the maker movement. For example, one respondent described a makerspace as:

*...a creative working space offering access via membership to a wide range of tools and equipment for digital production and rapid prototyping. The long term goal of such a project is to create opportunities to improve living standards, locally and globally (incubator) and to coagulate a powerful open-source community.. [Romanian respondent]*

A common feature used in defining the word was that there is a specific 'space' where 'creative' activities happen:

*A dedicated place for people (in this case, children) to go to create, innovate, design, problem-solve, build and think using open-ended and recycled materials. [UK respondent]*

*Space where children can create from all kinds of materials. The work itself is the most important not the outcome. [Icelandic respondent]*

*Space where learners have resources/materials, tools and workspace to experiment/try things out, design and create their own items. [Icelandic respondent]*

Only a few respondents mentioned the activities (workshops) as defining a makerspace, and even fewer respondents defined it by the community and culture around it, such as in the following response:

*A place where people of common interest, especially from IT and technologies, can gather to work on projects, while sharing ideas, tools and knowledge. [Romanian respondent]*

*Space where you can work creatively, innovate, do science and ICT. Many work together side by side or individually. [Icelandic respondent]*

References to the digital tools used in a makerspace were frequent, but sometimes other tools were mentioned:

*A place where creative activities can happen, with a minimal guidance from the library personnel, equipped with various tools, from IT to musical instruments, recording devices, sound and image editing, DIY tools, etc. [Romanian respondent]*

*Collection portal of materials ("trash") and tools, to make creative projects/works. [Icelandic respondent]*

One preschool teacher from Iceland insisted on associating the spirit of the makerspace with former practices:

*Although we have not used the term makerspace, which is new and fashionable, we have been working in this spirit in pre-schools for years. We have called it thematic work, ateliers, creative workshops, and so on. The only thing that is really new is the equipment, such as the i-pads. We have been using all kinds of computer devices which the children have been allowed to explore, and made all sorts of things. [Icelandic respondent]*

Some responses emphasised a common trope in the Do It Yourself movement, that of learning by doing:

*Makerspace is learning through trying yourself. [Romanian respondent]*

*It's a place where people can make things creatively and learn while doing. A place where you can learn by doing. [UK respondent]*

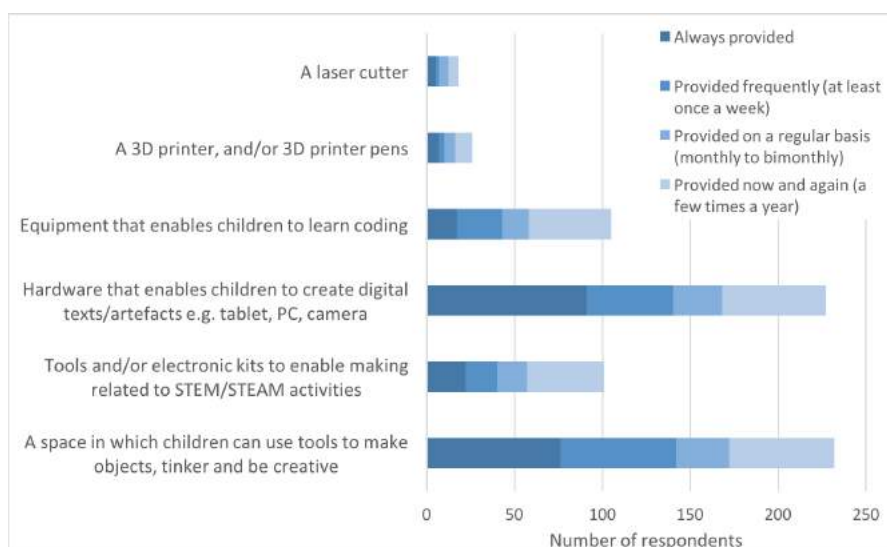
*Space where children can create their own work/items with their own agenda/goal. [Icelandic respondent]*



Overall, those respondents who were familiar with the concept of a makerspace demonstrated understanding of their key features.

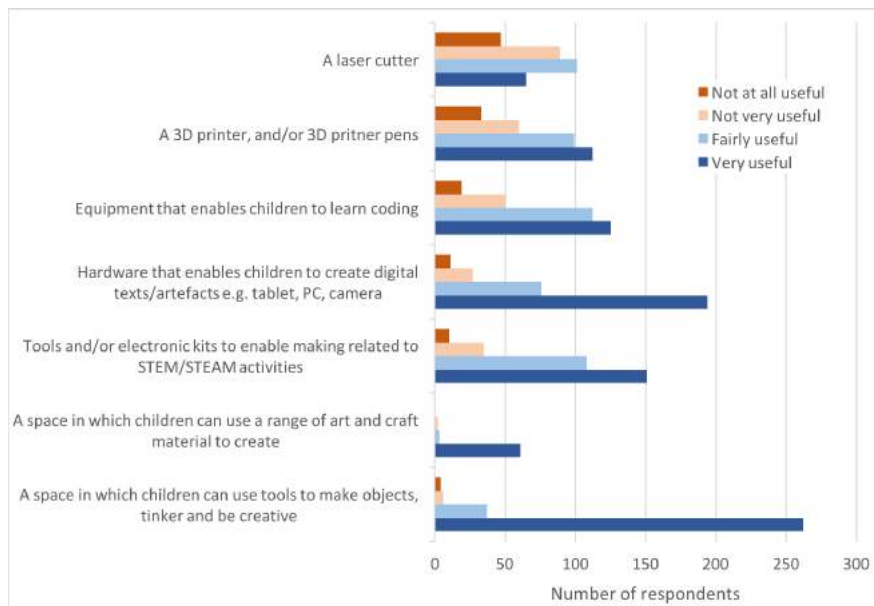
The survey also facilitated an exploration of how far early years practitioners were familiar with the kinds of equipment and resources that might be used in a makerspace. In Figure 1, it can be seen that the majority of respondents did work in places that offered spaces in which children could be creative. The materials that this group of professionals were most familiar with were digital tools and artefacts, such as a PC or camera. It is not surprising that very few provided more specialist equipment that is sometimes found in makerspaces, such as a 3D printer or a laser cutter, given the expense of such items. However, it was notable that only a minority of the respondents provided children with coding resources on a permanent, frequent or regular basis, demonstrating a need to raise early years practitioners' familiar with such equipment, given that coding is becoming recognised as an important element in the early childhood curriculum.

**Figure 1: Responses to Q4 - How often have the following elements of the makerspace initiatives described above been provided by your early years setting?**



Early years practitioners did, on the whole, feel that coding equipment would be a useful feature of a makerspace, and were also in favour of having access to other materials, although fewer felt that 3D printers or laser cutters would be of value (see Figure 2).

**Figure 2: Responses to Q6 - How useful would you consider each of the following elements from the description of makerspaces in early years settings?**



Only 18% of respondents reported that they had previously participated in makerspaces themselves, with 82% of respondents never having participated in them. Even fewer (16%), had organised a makerspace.

Of the minority who had organised makerspaces, they reported that they were run primarily by members of staff, with a few respondents stating that there was a mix of staff and volunteers (and 3 respondents who said that the makerspaces were mainly run by volunteers). In general, the makerspaces offered were more likely to be part of the curriculum than not, with 28% stating they were part of the core curriculum, 36% stating that they were an extracurricular activity and 36% stating that they were both. A range of activities were undertaken in the makerspaces that had been offered, including the following:

*Free access recyclable materials, open-ended construction materials, collage/design activities with a wide range of materials and tools, woodworking. [UK respondent]*

*Mostly Design Thinking, robotics, coding, and/or curriculum based activities generated from student ideas and questions. [UK respondent]*

*Coding, tinkering, place with different kind of materials that interest children where children can be creative. [UK respondent]*

*All kinds of everything, from various materials. A lot of costfree materials that becomes available. Work on "stations" where different kinds of assignments/tasks and materials are available. [Icelandic respondent]*

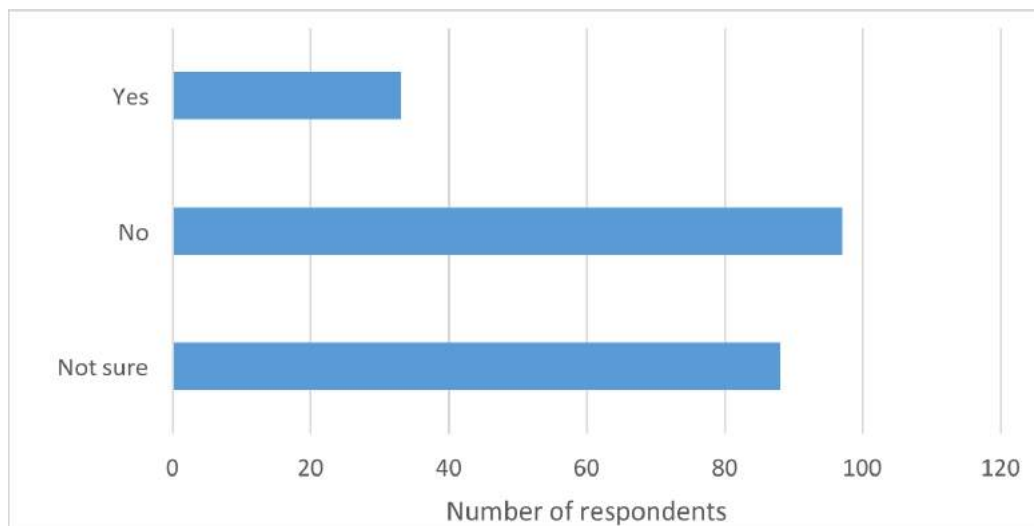
*Materials that becomes available at any given time is used and creative work started. Fun projects which can be guided by a certain theme or not. [Icelandic respondent]*

*Sprouts, nails, electronic equipment which children take apart, various materials made of plastic, paper, metal and many other things. [Icelandic respondent]*

*They can use anything in the art-hall and make whatever they like. Lots of fun. [Icelandic respondent]*

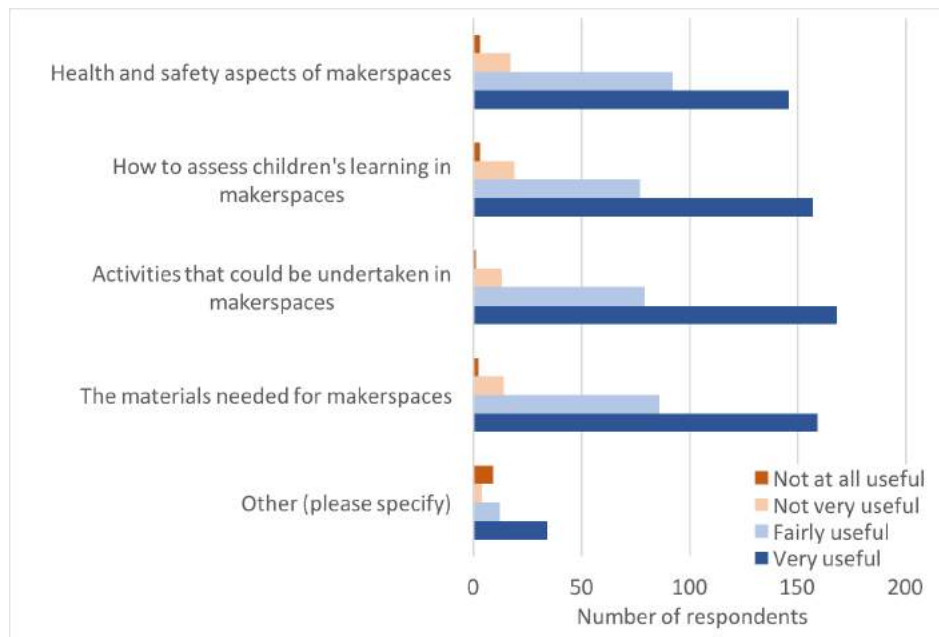
Practitioners were asked if they would have the resources in their setting to provide a makerspace, and Figure 3 indicates that the majority of respondents either felt that they would not, or would be unsure. The uncertainty may have been due to not being clear about what a makerspace was and what materials would be needed.

**Figure 3: Responses to Q9 - Would you have the resources available to provide a makerspace in your setting?**



Respondents were asked what aspects of makerspaces would they like to be offered training on, and the majority of respondents noted that they would find training useful on all aspects identified (see Figure 4).

**Figure 4: Responses to Q31 - How useful would you find it to have training on each of the following?**



Respondents were asked what other aspects of makerspaces they would like to be offered training on. Responses included funding and fitting makerspaces to curriculum content, as well as ideology and family makerspaces, natural science and physics, coding, and application of equipment:

*How to [teach] them to early years children which will have learning lesson and related to the theme of the course. [UK respondent]*

*How it is possible to link the tasks to the national curriculum which is a basis to get funding for this. [Icelandic respondent]*

*The ideology behind makerspaces. [UK respondent]*

*How can we help families create makerspaces in the home environment? [UK respondent]*

*Training in coding. [Icelandic respondent]*

*Training in the application of equipment which is used. [Icelandic respondent]*

One of the areas that was explored in the survey was the extent to which the educational philosophies of respondents aligned - or did not align - with approaches to learning used within makerspaces. Respondents were asked to outline the principles upon which their practice was based. As outlined in the MakEY literature review (Marsh et al., 2017<sup>1</sup>), a review of international early years provision identified four key aspects that were consistent across countries: child-centredness; play; social and emotional development and empowerment of the child to be an autonomous learner (Betram and Pascal, 2002: 35). These four were prominent in respondents' responses, for example:

*My ideas are mainly based on my experience in work with children in preschool. You could tie to that various theories but first and foremost it is about learning through play and creation, to get to discover and experience. [Icelandic respondent]*

*Child-led, child-centred, A skills based curriculum based on skills and process and not the 'finished' product. [UK respondent]*

*The play, learning through experimentation, active learning, child-centred education, team work, project. [Romanian respondent]*

*Active learning, team learning, developing the emotional intelligence, structuring the thought processes, stimulating creativity. [Romanian respondent]*

*Learning through play, active experiential learning with time and space to acquire, practise and develop the skills for life-long learning. [UK respondent]*

Others mentioned STEM, continuous provision, holistic learning, family engagement and outdoor provision. A few referred to the role of the adult in scaffolding learning. Many of the Icelandic respondents mentioned "learning by doing", sometimes with a specific reference to Dewey, some mentioned Reggio Emilia philosophy or Gardner's theory. In addition, personalised/individualised learning, enjoying youth, literacy, ICT, and collaborative learning were mentioned.

*Reggio Emilia, that the child is capable and have 100 languages. Children - the teacher and the environment create a community of learning. [Icelandic respondent]*

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<sup>1</sup> [http://makeyproject.eu/wp-content/uploads/2017/02/Makey\\_Literature\\_Review.pdf](http://makeyproject.eu/wp-content/uploads/2017/02/Makey_Literature_Review.pdf)

*Gardner's theory of intelligences, and Learning by doing. Open up children's horizon using diverse materials, and deepen their education. [Icelandic respondent]*

*Students' interest is accommodated in addition to the society demand about increased literacy which is integrated, inquiry learning. First and foremost taught through play. [Icelandic respondent]*

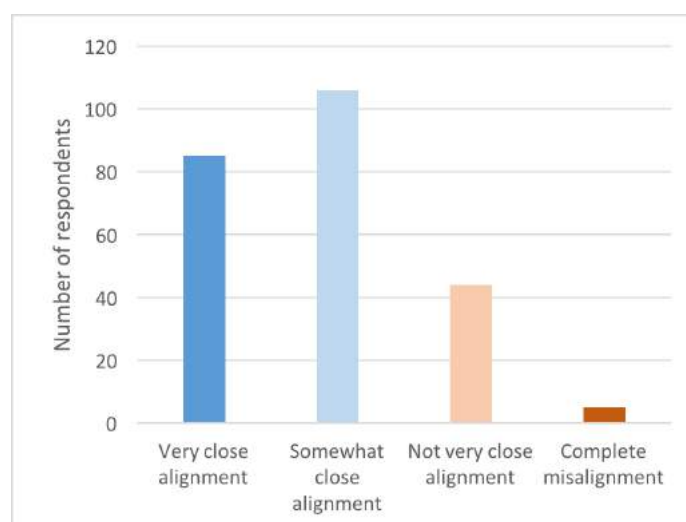
*That the child can enjoy his/her youth and the learning is tailored to his/her interest and capability. [Icelandic respondent]*

*Students' interest is accommodated in addition to the society demand about increased literacy which is integrated, inquiry learning. First and foremost taught through play. [Icelandic respondent]*

*To try to be creative teacher who uses creative and varied teaching methods that fit different groups of students. I have also used collaborative/cooperative learning a lot where students teach each other and apply their strength in the group work. [Icelandic respondent]*

Figure 5 indicates that the majority (77%) of practitioners felt that the approaches that could be used for learning in makerspaces were either very aligned (35%) or somewhat closely aligned (42%) with their educational philosophies. However, a sizeable minority (20%) felt that approaches for fostering learning in makerspaces were either not very closely aligned (18%) or completely misaligned (2%) with their philosophies.

Figure 5: Responses to Q12: How closely do you feel the approaches that could be used for learning in makerspaces align with your educational philosophy?



In general, when asked to justify their answer for the previous question, mostly those who felt that there was an alignment answered, offering various reasons. Thus, the effectiveness of this educational philosophy was brought into discussion for its attractiveness and motivational potential:

*Due to these means, children can be easily captivated to acquiring more knowledge, while performances will be attained much more rapidly. [Romanian respondent]*

*I believe in giving the students free choices in creative work, and encourage them to follow their own interests. [Icelandic respondent]*

Learning was obviously key to children's engagement in makerspaces, from the point of view of early years practitioners, and various models of learning were mentioned:

*'Children would acquire much better the theoretical knowledge through practice' [Romanian respondent].*

*'Providing children space to think for themselves, to question and explore and to challenge themselves. There is no limit to an inquisitive mind in learning.' [UK respondent].*

*They are extremely useful at all levels of learning: they allow the freedom to be creative, think around a subject and to make cognitive leaps that take learning forward. [UK respondent].*

*Work of a preschool teacher relies on learning by doing, more makerspaces and opportunities lead to more learning. [Icelandic respondent]*

*I think it is important for children to get the opportunity to exercise discovery learning and develop creativity and independent thinking. Let imagination soar/fly, experience creation process and how it develops from an idea to a product and let them experience the changes in the process. [Icelandic respondent]*

Some considered that the blend of new technology and old materials in education was the point where makerspaces and their educational philosophy intersected, whereas others stressed the proximity with the 'real world' that both philosophies had in common:

*We live in the real world and children need experiences as close to reality as possible (making objects, figures, scale models, geometrical figures), [Romanian respondent].*

Many of the respondents valued the creativity of makerspaces as being the common point with their own philosophies:

*I agree with everything that is creative and see that many children need very much to have an opportunity to create and use their imagination. [Icelandic respondent]*

*I am a special education teacher and ICT teacher and I love trying things out. I am by nature also very curious and want to experiment and experience things. I want everyone to have a chance to blossom/grow dependent on their own situation/abilities. [Icelandic respondent]*

*I am teaching woodwork and am using cutter/CNC machine in my work which students have access to for their projects. [Icelandic respondent]*

*I believe in learning through actions, creation and using all your senses to acquire understanding. [Icelandic respondent]*

*I teach natural science at the lower secondary level but I'm not thinking "squared". I have organised resources of parts from old electronic equipment to be recycled in simple electronic devices. [Icelandic respondent]*

*I emphasise creative learning which is meaningful for children. The learning consist children's interests and new things by teacher and peers. Learning is someway a co-creation of old (the learning that has already happen) and new learning. 21st century learning skills are also skills that I emphasise. [UK respondent]*



*I consider the experience in a makerspace to be necessary in order to stimulate children to create, to model, to experiment. [Romanian respondent].*

Some voiced the novelty of this philosophy as being the key point, as there is a need for appropriate methods to prepare children for the future:

*It's important that the teaching/learning/discovery should be made also through other ways and means than the traditional ones, in a world that tends to go towards an atypical future. [Romanian respondent].*

*Experience from working in schools and from having children in schools tells me that it is increased need for changed work methods. Creative thinking, critical thinking, to find your own strength - all this is supported, in my opinion, through work in this spirit. Pouring knowledge into students does not work anymore. [Icelandic respondent]*

*In our capacity of teachers, we prepare the children for life. It's important to offer them as varied spaces, where they should seek information, should seek the idea, the way they can work out a problem. Whatever it would be. [Romanian respondent].*

Some early years practitioners emphasised the need for an adult to scaffold learning effectively:

*Need correct ratio of adults to children. Found children need a lot of support to develop the skills necessary to support their vision. If an adult not there to help many children do not sustain their interest and motivation. [UK respondent]*

The policy contexts in which early years practitioners worked obviously shaped their responses. In Finland, a new national curriculum has been recently introduced, which emphasises creativity and multiliteracies:

*Finnish early childhood education has contained makerspace thinking a long time although teachers may not realise that automatically. In a way Finnish ECE national curriculum consists a lot of makerspace movement now and in the future. [Finnish respondent]*

In Iceland the curriculum also emphasises creativity in primary schools:

*According to the curriculum of elementary schools, creative work should be part of the students learning. [Icelandic respondent]*

In the UK, the curriculum is much more constrained for early years practitioners, and this was reflected in some of the responses outlining why implementing makerspaces might be a challenge:

*The setting in which I work has some limitations in terms of the fixed daily routines and way that adult support is structured. [UK respondent]*

*Due to the situation our school is currently in, our school is very results driven with little consideration for needs of the individual child [UK respondent]*

In summary, whilst the majority of early years practitioners who completed the survey had not been familiar with makerspaces prior to completing it, most felt that they would have value in early childhood education. The implications for the MakeEY project are discussed in the conclusion to this report.

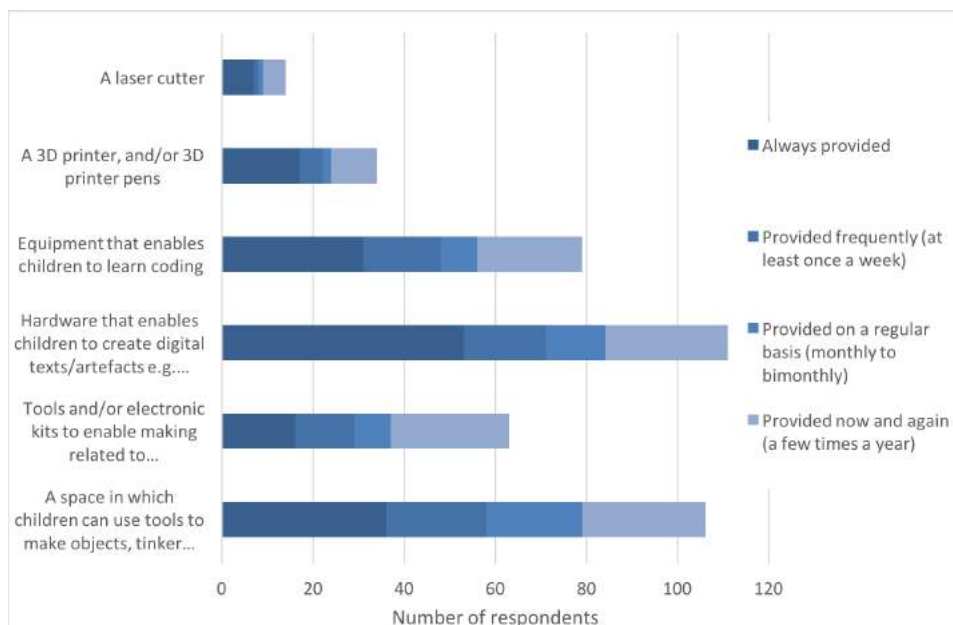
In the next section of the report, the responses of the library and museum staff are outlined.

# SECTION THREE

## LIBRARY AND MUSEUM STAFF

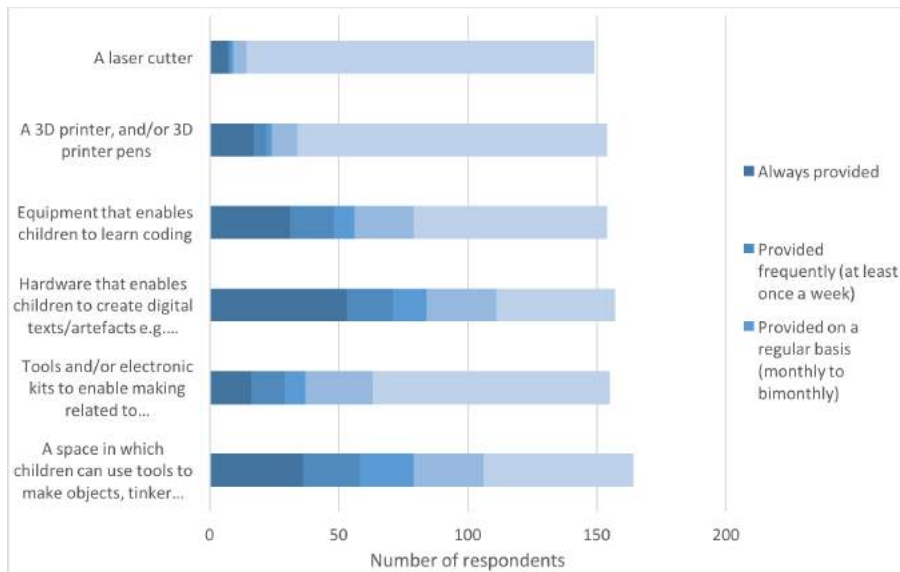
Just over half of the library and museum staff who completed the survey worked in public libraries (51%) and a further 17% worked in school or college libraries. The rest of the respondents worked in various kinds of museums (see Figure 6).

Figure 6: The types of institutions respondents worked in



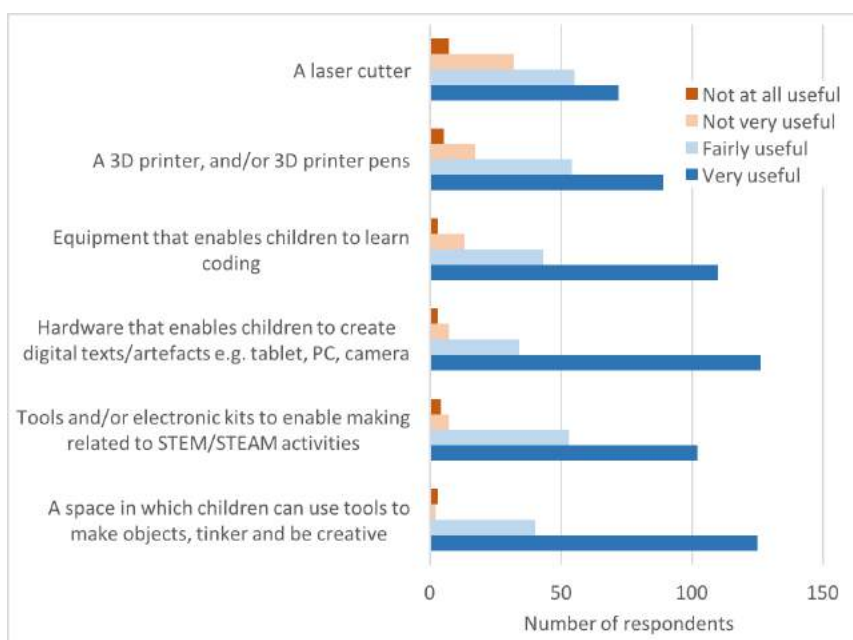
The institutions in which people worked did contain a greater range of materials for making than was the case in the early years settings the early years practitioners worked in, although it seemed that fewer libraries and museums had dedicated spaces for making, with 35% reporting that they never had space to use for this purpose, and 17% stating that they could provide a makerspace only now and again (see Figure 7).

**Figure 7: Response to Q54: Are there any elements of the makerspace initiatives described above that you feel are currently provided by your workplace?**



As was the case with the early years practitioners, the library and museum staff felt in general that they would find the various resources to be found in makerspaces useful, although, as in the case of the early years practitioners, the 3D printer and laser cutter was considered to be less useful than other resources (see Figure 8).

**Figure 8: Response to Q55 - How useful to [your setting] would you consider each of the following elements from the description of makerspaces?**



Twice as many library and museum staff (36%) than early years practitioners (18%) had experienced makerspaces themselves. The same percentage of library and museum staff had organised makerspaces and, in the makerspaces, 43% had been run by library and museum staff, 6% by volunteers and 52% a mixture of the two. The makerspaces had, as in the case of those offered by early years practitioners, consisted of a range of activities. One respondent emphasised the role of the child in making: *'Much of my work with under 5s is about using imagination. So my most common maker space is the child's mind.'* [UK respondent]. Other respondents mentioned undertaking a wide variety of activities in the makerspaces:

*All sorts of thematic tinkering, often with emphasis on recycled material. Facility for poetry making. Writing workshop.* [Icelandic respondent]

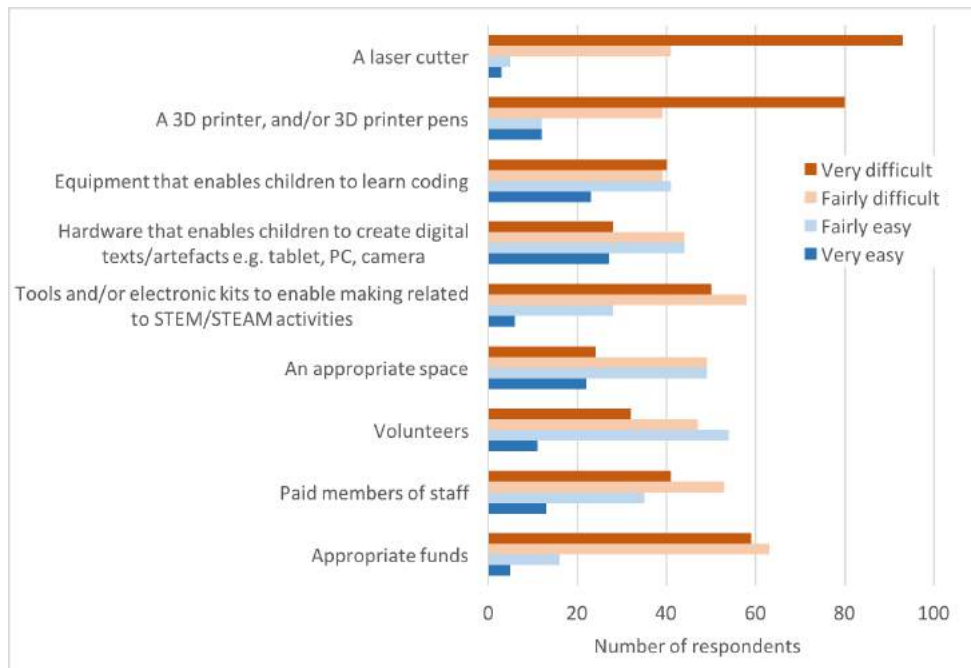
*Teaching programming with Scratch, python in Minecraft. Little bits innovation workshop. MakeyMakey innovation workshop.* [Icelandic respondent]

*Workshop where we worked with trash after discussion about the environment. Graphic workshop, wool drawing workshop, digital animation workshop, web workshop, music workshop, colour and light workshop, water workshop, interactive musical composition workshop, electronic art and drawing workshops, and much more.* [Icelandic respondent]

Some answers suggested that some staff had adopted a rather school/ educational-oriented approach: (workshops were about) *'elementary notions of computer use, financial education training, interactive lessons (math, geography, history, etc.)'* [Romanian respondent].

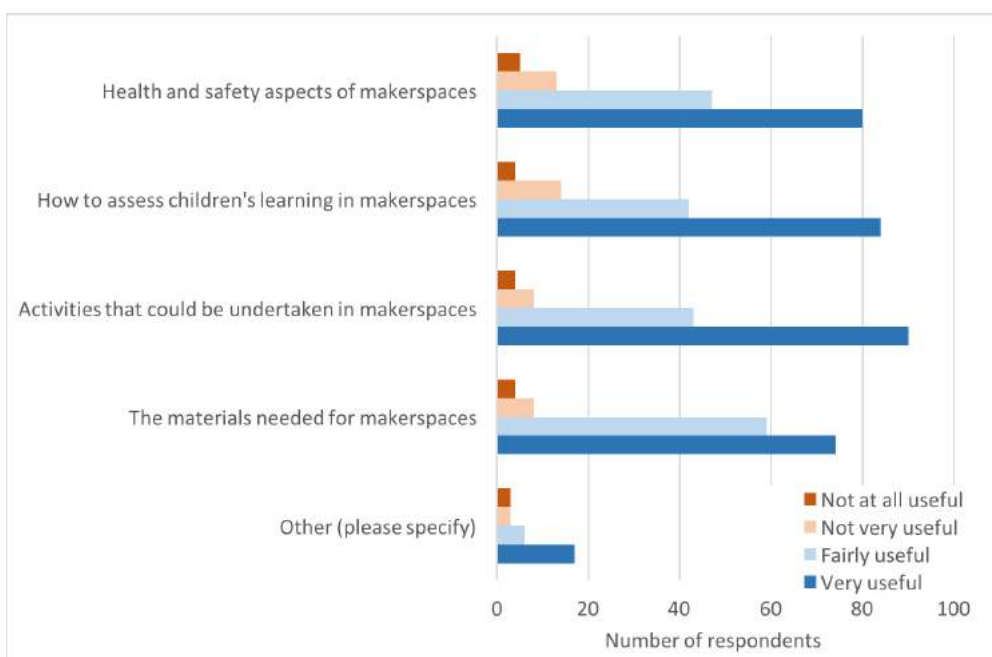
The respondents reported that, on the whole, they would find it difficult to access resources, although the most easily accessible resources were digital (e.g. PCs and cameras and coding equipment) (see Figure 9).

Figure 9: Responses to Q58: How easy would it be to find the following resources for a makerspace in your current setting?



As was the case with the early years practitioners, a majority of library and museum staff stated that they would find it useful to have training on various aspects of working in makerspaces (see Figure 10).

Figure 10: Responses to Q59: How useful would you find it to have training on the following?



Training on additional areas were mentioned, including 'Minecraft' [UK respondent] and creating a group/groups around such projects; teacher collaboration in makerspace work in relation to the curriculum guide; programming [Icelandic respondents]. If some of the respondents expressed general needs in terms of training – 'About the efficient organising of space and equipments' or about 'all that is new'– others were interested to find out how to get funding for financing such spaces. A singular [Romanian] answer opened a space for reflection on the aims of making, with the respondent stating that he or she would want to know about 'using objects created'.

As was the case with the early years practitioners, when asked about the principles that underpinned their practice, museum and library staff emphasised child-centred approaches, but there was also a focus on the engagement of families, inclusive practice, exploration, and the sparking of an interest in reading:

*Students should be mobilised to come to the library, explore, experience and learn in a different way than they do within the formal education. We try to have as much "hand-on" projects as we can, otherwise we use discussions and open questions to get students to think about the exhibitions. [Icelandic respondent]*

*Teaching is very limited, but the aim is to attract and increase the number of children coming to the library, encourage reading, and information literacy. The emphasis is not on creativity or entrepreneurship. I think that creative spaces are positive, and have had the opportunity to become familiar with that in libraries abroad, both to stimulate, and encourage children (and also adults). The accumulating impact of such workshops are also a good thing; more diversity in our work makes the library more attractive, and can spark interest in both books and in reading. [Icelandic respondent]*

*Child-centred, children as competent museum visitors, creators and researchers in their own right. [UK respondent]*

*Focussed on child friendly for both children and families, formal learning - immersive and active participation. [UK respondent]*

*Child-centred learning, active learning, digital inclusion, activities for all (inclusion). [UK respondent]*

*That libraries are public spaces, open to all those that want to come - they have to have all sorts of cultural activities - which everybody should be able to access, and should KNOW about them. [Icelandic respondent]*

Other respondents mentioned the principles of accessibility, in-depth understanding and that of active participation or learning by playing. Beyond the 'open to all' principle, sometimes more specific aims were voiced, such as 'adult education', or reaching and engaging wider audiences, especially children and elderly people. A library, in the vision of some of the respondents, is a place of mediation (between generations, between people and educational institution etc.) or a place of initiating knowledge (on STEM subject or encyclopaedic knowledge):

*The principle of respecting children's rights, of mediating learning within the educational process, of learning through play, of partnering with family and community. [Romanian respondent]*

*I'd very much like that the coding and programming classes children take now, at the library, should have a finality, by organising some robotics workshops within which children would learn to make some small mobile devices, and thus the library will encourage the passion for science and to disseminate science's beauty towards the younger members of the community. [Romanian respondent]*

Figure 10 indicates that the majority (84%) of library and museum staff felt that the approaches that could be used for learning in makerspaces were either very aligned (45%) or somewhat closely aligned (39%) with their educational philosophies, a higher proportion than that of early years practitioners. However, 16% felt that approaches for fostering learning in makerspaces were either not very closely aligned (12%) or completely misaligned (4%) with their philosophies.

Where philosophies were well-aligned, respondents emphasised inclusion, interactive learning and creativity:



*I think that creative activities are well suited in museums, and can contribute to making them more popular as places to be in. [Icelandic respondent]*

*I think one could connect that kind of creation to much of what we work with here and in the classroom. It would be a collaborative project with the classroom teacher. [Icelandic respondent]*

*Practical skills and interactive experience at the foundation to what we offer. [UK respondent]*

*I believe in education for all and I believe that my employer, Leeds Libraries, actively includes children of all backgrounds and abilities. [UK respondent]*

*My education was in ICT in teaching and learning from Iceland University of Education so I have a good background in working skills, and in integrating mind and deed. [Icelandic respondent]*

Some respondents explained the commonality in educational philosophy by their aim (e.g. to attract youth by the means of digital technology), whereas other mentioned their common interest in 'the environment': 'The environment', with all it means, the space, the humans... is in first place' [Romanian respondent]. Others justified their commonality in the principles of makerspaces by opposition or complementarity with the educational system (seen as promoting theoretical education):

*The child should not be forced to take these activities as a follow up to the classes, but should feel like they're putting in practice the subject they've studied. [Romanian respondent]*

*In a makerspace the focus is placed on manuality and creativity, learn through play. It's what is lacks from the current educational system. [Romanian respondent]*

Some respondents mentioned layers of commonalities, rejecting the idea of a total overlapping of philosophies:

*The library, just like the makerspace, is a space for inspiration and creativity, and they only differ in the methods and methods they use. The method used by now in the library combines elements from makerspaces, without being aware of that. [Romanian respondent]*

*I think it's a different approach, but the result is the same. [Romanian respondent]*

At a personal level, many voices expressed their desire to organise a makerspace in their institution (libraries were mentioned), with some complaining that *'the lack of funding and of spaces prevents me'* [Romanian respondent]. Other respondents framed it not in terms of personal preferences, but as a 'vocation' or 'public duty' of the libraries to organise this kind of space, as the quote below indicates:

*Romanian public libraries are in a phase of redefining their services, but also their principles and values. The public's needs started coming first, in the libraries' services. It's a difficult transformational process, but professional leaders and librarians make efforts to sustain it. Although the authorities and the public opinion in Romania don't see that for the moment, public libraries are the perfect places for makerspaces. [Romanian respondent].*

Some mentioned that offering makerspaces was necessary in contemporary society, as they incorporated the use of technologies, which could attract young people:

*Is the approach that is necessary during this time, when the library should also integrate better in the information society and attract young people also by these modern methods of using IT. [Romanian respondent]*

The Romanian respondents also proposed that makerspaces could be of value to all types of libraries:

*In order to make them happen, such projects for establishing makerspaces, we need that 1. In the targeted public institutions there should be active employees, willing to get involved 2. A management prone to the paradigmatic changes required. I am afraid that both points are, in Romania, only scarcely fulfilled. [Romanian respondent].*

*It would be useful to explain the usefulness of such spaces also in the universities' libraries. Moreover, it would be useful that such spaces should be fitted to other types of libraries, for other type of users, of other age groups, etc. [Romanian respondent].*

It may be the case that the provision of makerspaces in libraries is less developed in Romania than the other European countries involved in the project, which is why there was an emphasis on the kinds of policy developments that would further this area.

Examples of from those few who thought the philosophy not very well aligned included an emphasis on the importance of libraries in relation to learning to read and/or that activities in makerspaces should be in a different place than the school library:

*I think that the main role of school libraries is to support children to learn to read and their reading interest and when it is a never-ending problem to get sufficient finances for buying books I can just imagine how it would be to get money for makerspace. We need to prioritise correctly and reading is everything (I am speaking from an experience of 30 years). A child who has not learned to read becomes disadvantaged in many areas. The idea about makerspace is a good one but based on how things are today this is not at the top of the wish list. Pupils, at least in my school, have various access to many kinds of materials to create with but those are not in the school library and the facilities there are simply not suitable. [Icelandic respondent]*

*Should be separate, not in the library. [Icelandic respondent]*

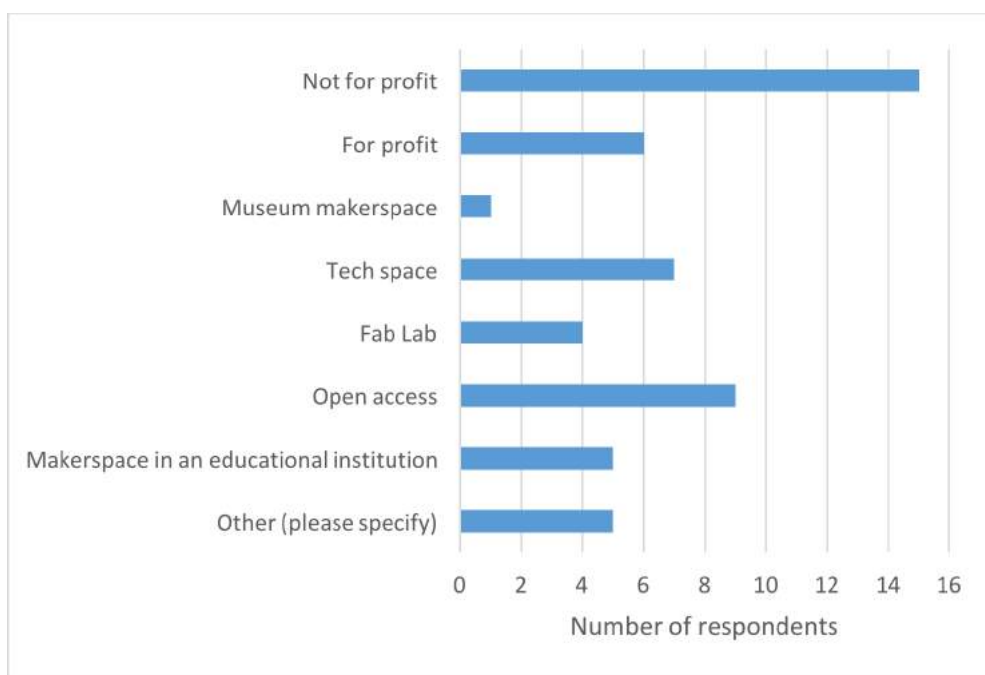
In summary, responses from library and museum staff mainly demonstrated enthusiasm about the potential of makerspaces for their institutions, and identified a range of benefits to be accrued from their introduction.

# SECTION FOUR

## MAKERSPACE STAFF

The survey was completed by a small number of makerspace staff - 37. The majority of those worked in the not-for profit sector (see Figure 11).

Figure 11: Types of makerspaces people worked in



Note: Respondents were allowed to select multiple features to describe their institution

When staff from makerspaces were asked to share their understanding of what a makerspace is, interestingly enough, many respondents did not define it by the technology available, but by what it offers in terms of personal development:

*A creative place where users can put their ideas in practice, literally.* [Romanian respondent].

*A place to personal growth and development – or its culture.* [Romanian respondent].

*A place where people can come to make the things they want, get creative, try new things- all hands on, minds on. [UK respondent].*

*Space to create, make and test out. [Icelandic respondent].*

*A makerspace is a place for creative collaboration and hands-on learning for all ages. [UK respondent].*

However, some of the UK respondents did emphasise the access to resources:

*A space where people can access equipment and knowledge that's not readily available for purchase or not realistic to have at home. [UK respondent].*

*We offer tools, materials, and techniques (e.g. Design Thinking, safe tool use) to help students build what they conceptualise. [UK respondent].*

*A place where people make things they have designed, are exploring/developing with or without, but usually with, digital tools and rapid prototyping technologies [UK respondent].*

Some respondents aligned makerspaces to the principles of the Maker movement, emphasising the importance of offering a space to 'tinker':

*A space that encourages making with a tinkering mindset. [UK respondent].*

*An environment where children discover STEM through hands-on tinkering experiences. [UK respondent].*

It is, perhaps, not surprising that this group of respondents would draw on terminology common to the maker community.

All of the respondents stated that they felt makerspaces could be of value to children aged 3-8. Respondents offered a variety of reasons for why they felt this to be the case. Many mentioned that they felt that children of this age were naturally inquisitive and creative:

*Children are natural inquirers, players and creators. [UK respondent]*

*Children are natural inventors, scientists at that age and will try to make things without a lot of self-criticism. If you say yes, they will try it. [UK respondent]*

*I am a maker educator, in my experience people of all ages love to make in some capacity. Children ages 3-8 also tend to be less inhibited than older children and people to make as it is more culturally accepted. [UK respondent]*

Others were more future-oriented:

*I'm currently working to build a makerspace in Sheffield. Sheffield is a maker and creator city so it would fit the culture well. In addition, the next generation will be the creator generation. They already have easy access to creating content and even hardware. The biggest obstacle is spreading the word that these services and mediums exist and are affordable. In addition, the economy is beginning to rely more on services. Product is still important, but people are buying experiences more than the product itself. Also, I can see education evolving where children lead the experience and teachers use children's curiosity to drive the direction of the classroom. Self-discovery is the best way to learn. [UK respondent]*

Finally, some respondents emphasised children's fascination for technology:

*We have hosted coding workshops for primary age children and they worked very well. Children seem to love new technology. [UK respondent]*

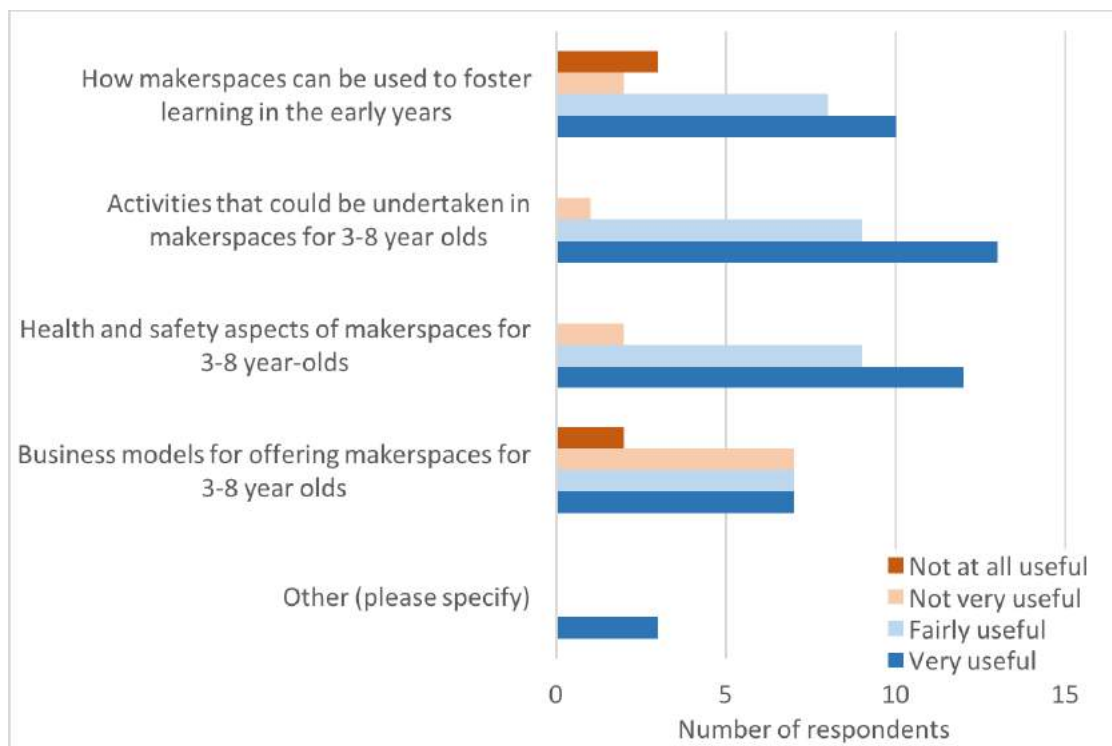
*My 8 year old is always pestering to use the router. [UK respondent]*

A number of respondents - 11 (almost a third) - had previously organised a makerspace in an early years settings. This figure is surprising, given how few early years practitioners had stated that their settings had offered makerspaces, but perhaps indicates that the survey attracted makerspace staff who already had interest and experience in the area. Six staff stated that they had organised a makerspace in a museum or library and 7 in another kind of public space. Of the 25 respondents who answered the question, only four said that they would not be

interested in providing makerspaces for children aged eight and under in the future. The majority of staff (15) stated that they would need training in order to do this, two stated that they would not need it, and eight staff were not sure. The majority of respondents suggested that, in general, they would find all aspects of training useful (see Figure 12), although they perceived as least useful training on business models for offering makerspaces for young children. This may be related to the fact that the majority of makerspace staff who responded worked in not-for-profit organisations. Of those that would find business model training useful, this was linked to a desire to expand their provision and expertise:

*I have some experience working with 7-11 year olds in creative environments, not organised by myself. I especially need help with the business model side. I want to create a space where children can self-discover and be exposed to areas they would otherwise not have access to.*  
 [UK respondent]

Figure 12: Responses to Q31 - How useful would you find it to have training on each of the following?



Makerspace staff were a little more concerned about training on safety issues than the previous two groups of respondents, which is, perhaps, not surprising if staff have had less experience of working with young children and, therefore, less of an understanding about what tools children can manage:

*Safety is the biggest concern in my opinion for younger makers. [UK respondent]*

*Safety is a big issue with all the tools available in the makerspace which is why I believe that a training would be very useful. Most trainings are geared towards older children. [UK respondent]*

In summary, the makerspace staff who responded to the survey had a great interest in working with young children. Given the small sample, it is not possible to say how widely this feeling is shared, but it does indicate that there are possibilities for developing provision specifically for young children.



# SECTION FIVE

## CONCLUSION

The survey indicated that there were two main differences between the different groups that completed the survey. The first difference was in relation to exposure to makerspaces. Obviously, makerspaces staff had much experience, largely in the not-for-profit sector. Library and museum staff had more knowledge of makerspaces than early years practitioners, which may be due to the fact that the institutions in which they worked would have fewer constraints in terms of curriculum constraints than early years settings. In addition, the Maker Movement in North America is very strongly promoted in libraries and museums, and so this may have informed the European sector's knowledge of makerspaces. The second difference could be seen in relation to attitudes. Whilst the majority of early years practitioners did feel that makerspaces could be of value, the largest number of respondents who said they did not feel that they would have value were also early years practitioners. All of the makerspace staff stated that they felt makerspaces would be of value to young children.

Fewer than twenty percent of early years practitioners had taken part in a makerspace. There is obviously much to do to extend provision in this area. Twice as many library and museum staff (36%) than early years practitioners (18%) had experienced makerspaces themselves, but that still indicates that there is a need to develop practice in these institutions also. One of the key barriers to the provision of makerspaces in early years settings, libraries and museums appears to be a lack of resources, and also the need for further training on certain aspects of making, such as the kinds of activities that could be undertaken, how to assess the learning that occurs, and health and safety issues. Makerspace staff also stated that they would also value training in these areas, and particularly emphasised training on safety issues.

There are a number of implications of the survey findings for the MakeEY project, as follows:

1. Support is needed so that early years practitioners and library and museum staff, in addition to makerspace staff, can become familiar with the types of activities that might be

undertaken in makerspaces for young children. A first step, therefore, would be to provide case studies of activities on the Open Educational Resource section of the MakeY website.

2. Advice about undertaking risk assessments for makerspace activities would be of value to all groups. Given the specific contexts of makerspaces, it is not possible to provide particular advice, but the Open Educational Resource section of the MakeY website could offer key pointers for consideration.
3. Other aspects of the Open Educational resource that could be developed, in addition to the above, are: (i) an overview of how makerspaces can support young children's learning; (ii) advice on how to assess learning in makerspaces and (iii) guidance on how to access relevant resources.
4. Given that many of the respondents felt that makerspaces related well to their educational philosophies, interviews should be undertaken with early years practitioners and makerspace staff and then placed on the MakeY Open Educational Resource, in order to inspire and reassure others that makerspaces align well to current practice.
5. Consideration should be given to developing advice for makerspace staff on creating a business model for work with young children. This may then be promoted via the MakeY website.

The survey has been a useful tool in confirming that the direction of travel of the MakeY project is fit for purpose. One of the main aims of the project is to develop practice in this area, and the survey has reinforced the need to undertake concerted work in this area.

# APPENDIX I

## SURVEY

Q1 This survey is being undertaken as part of the MakeEY project, which aims to find out how makerspaces for 3-8 year-olds can be developed in kindergarten and nurseries, schools, museums and libraries in order that young children can develop the skills and knowledge required for the digital age. (The project website is here if you want to find out more about the project: <http://makeyproject.eu>)

We want to find out what a range of different people know, and would like to do, in relation to this topic. The information provided by you in this questionnaire will be used for research purposes. It will not be used in a manner which would allow identification of your individual responses. This anonymous survey will take 5-10 minutes to complete.

Anonymised research data will be archived at in an open data repository in order to make them available to other researchers in line with current data sharing practices.

Thank you very much for agreeing to participate in this survey.

### **SURVEY QUESTIONS FOR ALL**

Q52 In which country do you currently live?

- Australia (9)
- Canada (31)
- Finland (60)
- Ireland (82)
- New Zealand (123)
- United Kingdom (185)
- United States of America (187)
- Afghanistan (1)
- Albania (2)
- Algeria (3)
- Andorra (4)
- Angola (5)
- Antigua and Barbuda (6)
- Argentina (7)

- Armenia (8)
- Austria (10)
- Azerbaijan (11)
- Bahamas (12)
- Bahrain (13)
- Bangladesh (14)
- Barbados (15)
- Belarus (16)
- Belgium (17)
- Belize (18)
- Benin (19)
- Bhutan (20)
- Bolivia (21)
- Bosnia and Herzegovina (22)
- Botswana (23)
- Brazil (24)
- Brunei Darussalam (25)
- Bulgaria (26)
- Burkina Faso (27)
- Burundi (28)
- Cambodia (29)
- Cameroon (30)
- Cape Verde (32)
- Central African Republic (33)
- Chad (34)
- Chile (35)
- China (36)
- Colombia (37)
- Comoros (38)
- Congo, Republic of the... (39)
- Costa Rica (40)
- Côte d'Ivoire (41)
- Croatia (42)
- Cuba (43)
- Cyprus (44)
- Czech Republic (45)
- Democratic People's Republic of Korea (46)
- Democratic Republic of the Congo (47)
- Denmark (48)
- Djibouti (49)
- Dominica (50)
- Dominican Republic (51)
- Ecuador (52)

- Egypt (53)
- El Salvador (54)
- Equatorial Guinea (55)
- Eritrea (56)
- Estonia (57)
- Ethiopia (58)
- Fiji (59)
- France (61)
- Gabon (62)
- Gambia (63)
- Georgia (64)
- Germany (65)
- Ghana (66)
- Greece (67)
- Grenada (68)
- Guatemala (69)
- Guinea (70)
- Guinea-Bissau (71)
- Guyana (72)
- Haiti (73)
- Honduras (74)
- Hong Kong (S.A.R.) (75)
- Hungary (76)
- Iceland (77)
- India (78)
- Indonesia (79)
- Iran, Islamic Republic of... (80)
- Iraq (81)
- Israel (83)
- Italy (84)
- Jamaica (85)
- Japan (86)
- Jordan (87)
- Kazakhstan (88)
- Kenya (89)
- Kiribati (90)
- Kuwait (91)
- Kyrgyzstan (92)
- Lao People's Democratic Republic (93)
- Latvia (94)
- Lebanon (95)
- Lesotho (96)
- Liberia (97)

- Libyan Arab Jamahiriya (98)
- Liechtenstein (99)
- Lithuania (100)
- Luxembourg (101)
- Madagascar (102)
- Malawi (103)
- Malaysia (104)
- Maldives (105)
- Mali (106)
- Malta (107)
- Marshall Islands (108)
- Mauritania (109)
- Mauritius (110)
- Mexico (111)
- Micronesia, Federated States of... (112)
- Monaco (113)
- Mongolia (114)
- Montenegro (115)
- Morocco (116)
- Mozambique (117)
- Myanmar (118)
- Namibia (119)
- Nauru (120)
- Nepal (121)
- Netherlands (122)
- Nicaragua (124)
- Niger (125)
- Nigeria (126)
- North Korea (127)
- Norway (128)
- Oman (129)
- Pakistan (130)
- Palau (131)
- Panama (132)
- Papua New Guinea (133)
- Paraguay (134)
- Peru (135)
- Philippines (136)
- Poland (137)
- Portugal (138)
- Qatar (139)
- Republic of Korea (140)
- Republic of Moldova (141)

- Romania (142)
- Russian Federation (143)
- Rwanda (144)
- Saint Kitts and Nevis (145)
- Saint Lucia (146)
- Saint Vincent and the Grenadines (147)
- Samoa (148)
- San Marino (149)
- Sao Tome and Principe (150)
- Saudi Arabia (151)
- Senegal (152)
- Serbia (153)
- Seychelles (154)
- Sierra Leone (155)
- Singapore (156)
- Slovakia (157)
- Slovenia (158)
- Solomon Islands (159)
- Somalia (160)
- South Africa (161)
- South Korea (162)
- Spain (163)
- Sri Lanka (164)
- Sudan (165)
- Suriname (166)
- Swaziland (167)
- Sweden (168)
- Switzerland (169)
- Syrian Arab Republic (170)
- Tajikistan (171)
- Thailand (172)
- The former Yugoslav Republic of Macedonia (173)
- Timor-Leste (174)
- Togo (175)
- Tonga (176)
- Trinidad and Tobago (177)
- Tunisia (178)
- Turkey (179)
- Turkmenistan (180)
- Tuvalu (181)
- Uganda (182)
- Ukraine (183)
- United Arab Emirates (184)

- United Republic of Tanzania (186)
- Uruguay (188)
- Uzbekistan (189)
- Vanuatu (190)
- Venezuela, Bolivarian Republic of... (191)
- Viet Nam (192)
- Yemen (193)
- Zambia (580)
- Zimbabwe (1357)

Q2 Which of the following best describes your role?

- Early years practitioner (1)
- Library professional (2)
- Museum practitioner (3)
- Makerspace staff (4)

## **SURVEY FOR EARLY YEARS PRACTITIONERS**

Q3 Have you previously heard about makerspaces before today?

- Yes (1)
- No (2)

Display This Question:

If Have you previously heard about makerspaces? No Is Selected

Q86 If you had not, they can be defined as spaces that enable people to make objects, to tinker, to hack and to generally be playful and creative. They can contain a range of resources for making, including art and craft materials, electronic equipment, 3D printers, laser cutters and so on. Users can make a wide range of objects, but popular outputs include moving figures, e-textiles (textiles that embed technology), robots and pictures and objects that light up, make noises etc. They may enable users to learn skills such as coding, design, how to create circuits and simple manufacturing skills.

Display This Question:

If Have you previously heard about makerspaces? Yes Is Selected

Q96 How do you understand the term "makerspace"?



**Q4 How often have the following elements of the makerspace initiatives been provided by your early years setting?**

	Always provided (1)	Provided frequently (at least once a week) (2)	Provided on a regular basis (monthly to bimonthly) (3)	Provided now and again (a few times a year) (4)	Never provided (5)
A space in which children can use tools to make objects, tinker and be creative (1)	μ	μ	μ	μ	μ
Tools and/or electronic kits to enable making related to STEM/ STEAM activities (3)	μ	μ	μ	μ	μ
Hardware that enables children to create digital texts/ artefacts e.g. tablet, PC, camera (4)	μ	μ	μ	μ	μ
Equipment that enables children to learn coding (5)	μ	μ	μ	μ	μ
A 3D printer, and/or 3D printer pens (6)	μ	μ	μ	μ	μ
A laser cutter (7)	μ	μ	μ	μ	μ

**Q6 How useful would you consider each of the following elements from the description of makerspaces in early years settings?**

	Very useful (1)	Fairly useful (2)	Not very useful (3)	Not at all useful (4)
A space in which children can use tools to make objects, tinker and be creative (1)	μ	μ	μ	μ
A space in which children can use a range of art and craft material to create (2)	μ	μ	μ	μ
Tools and/or electronic kits to enable making related to STEM/ STEAM activities (3)	μ	μ	μ	μ

Hardware that enables children to create digital texts/artefacts e.g. tablet, PC, camera (4)	μ	μ	μ	μ
Equipment that enables children to learn coding (5)	μ	μ	μ	μ
A 3D printer, and/or 3D printer pens (6)	μ	μ	μ	μ
A laser cutter (7)	μ	μ	μ	μ

Q7 Have you ever participated in a makerspace yourself?

- Yes (1)
- No (2)

Q8 Have you ever organised a makerspace in your setting with children?

- Yes (1)
- No (2)

Display This Question:

If Have you ever organised a makerspace in your setting with children? Yes Is Selected

Q90 Can you describe what kinds of activities have been on offer when you've organised a makerspace?

Display This Question:

If Have you ever organised a makerspace in your setting with children? Yes Is Selected

Q91 When makerspaces are organised in your setting, are they primarily run by members of staff, volunteers, or a mixture of the two?

- Members of staff (1)
- Volunteers (2)
- A mixture of the two (3)

Display This Question:

If Have you ever organised a makerspace in your setting with children? Yes Is Selected

Q94 In your setting, are makerspaces mainly offered as part of the core curriculum, as an extracurricular activity, or both?

- As part of the core curriculum (1)
- As an extracurricular activity (2)
- Both (3)

Display This Question:

If Have you ever organised a makerspace in your setting with children? No Is Selected

Q9 Would you have the resources available to provide a makerspace in your setting?

- Yes (1)
- No (2)
- Not sure (3)

Q10 How useful would you find it to have training on each of the following?

	Very useful (1)	Fairly useful (2)	Not very useful (3)	Not at all useful (4)
The materials needed for makerspaces (1)	μ	μ	μ	μ
Activities that could be undertaken in makerspaces (2)	μ	μ	μ	μ
How to assess children's learning in makerspaces (3)	μ	μ	μ	μ
Health and safety aspects of makerspaces (4)	μ	μ	μ	μ
Other (please specify) (5)	μ	μ	μ	μ

Q11 What are the principles upon which your educational practice in early childhood settings is based? (e.g. your educational philosophy, such as child-centred, active learning etc.)

Q12 How closely do you feel the approaches that could be used to learning in makerspaces align with your educational philosophy?

- Very close alignment (1)
- Somewhat close alignment (2)
- Not very close alignment (3)
- Complete misalignment (4)

Q13 Please tell us a little about why you think this

Q14 Do you have any other comments about makerspaces that could inform our project, at a personal, institutional or national level?

Q15 How old were you at your last birthday?

- 25 or under (1)
- 26-35 (2)

- 36-45 (3)
- 46-55 (4)
- 56-64 (5)
- 65 or older (6)

Q16 What is your gender?

- Male (1)
- Female (2)

Other (please specify) (3) \_\_\_\_\_

Q17 Is this the same gender that you were ascribed at birth?

- Yes (1)
- No (2)

Q18 What is your job title?

Q19 What do you mainly do in your job?

Q20 In your job, did you have formal responsibility for supervising the work of other employees?

- Yes (1)
- No (2)

Q21 For how long have you worked in early years education?

- 5 years or less (1)
- 6-10 years (2)
- 11-20 years (3)
- More than 20 years (4)

Display This Question:

If List of Countries United Kingdom Is Selected

Q22 Which of the following qualifications do you have?

- GCSEs (1)
- A-levels (2)
- Apprenticeship (3)
- GNVQ/City and Guilds (4)
- Undergraduate degree (5)
- Postgraduate degree (6)

Display This Question:

If List of Countries United States of America Is Selected

Q107 Which of the following qualifications do you have?

- High school diploma or GED (2)
- Vocational qualification (3)
- Some college (7)
- Associate's degree (8)
- Bachelor's degree (4)
- Postgraduate degree (6)

Display This Question:

If List of Countries United States of America Is Selected

Q108 Which of the following qualifications do you have?

- High school diploma or GED (2)
- Vocational qualification (3)
- Some college (7)
- Associate's degree (8)
- Bachelor's degree (4)
- Postgraduate degree (6)

Display This Question:

If List of Countries Finland Is Selected

Q109 Which of the following qualifications do you have?

- Peruskoulun päättötodistus (1)
- Ylioppilastutkinto (2)
- Oppisopimuskoulutus (3)
- Ammattitutkinto (4)
- Korkeakoulututkinto (5)

Display This Question:

If List of Countries United States of America Is Not Selected

And List of Countries United Kingdom Is Not Selected

And List of Countries Finland Is Not Selected

Q110 Which of the following qualifications do you have?

- School leaving qualification (2)
- Vocational qualification (3)
- Some university education (8)
- Bachelor's degree (4)
- Postgraduate degree (6)

Q23 If you have a professional qualification related to early childhood teaching, please specify it

Q24 Thank you for completing this form!

## SURVEY FOR LIBRARY AND MUSEUM STAFF

Q53 Had you previously heard about makerspaces before today?

- Yes (1)
- No (2)

Display This Question:

If Had you previously heard about makerspaces before today? No Is Selected

Q85 If you had not, they can be defined as spaces that enable people to make objects, to tinker, to hack and to generally be playful and creative. They can contain a range of resources for making, including art and craft materials, electronic equipment, 3D printers, laser cutters and so on. Users can make a wide range of objects, but popular outputs include moving figures, e-textiles (textiles that embed technology), robots and pictures and objects that light up, make noises etc. They may enable users to learn skills such as coding, design, how to create circuits and simple manufacturing skills.

Display This Question:

If Had you previously heard about makerspaces before today? Yes Is Selected

Q88 How do you understand the term "makerspace"?

Q54 Are there any elements of the following makerspace initiatives that you feel are currently provided by your workplace?

	Always provided (1)	Provided frequently (at least once a week) (2)	Provided on a regular basis (monthly to bimonthly) (3)	Provided now and again (a few times a year) (4)	Never provided (5)
A space in which children can use tools to make objects, tinker and be creative (1)	μ	μ	μ	μ	μ
Tools and/or electronic kits to enable making related to STEM/ STEAM activities (3)	μ	μ	μ	μ	μ
Hardware that enables children to create digital texts/ artefacts e.g. tablet, PC, camera (4)	μ	μ	μ	μ	μ

Equipment that enables children to learn coding (5)	μ	μ	μ	μ	μ
A 3D printer, and/or 3D printer pens (6)	μ	μ	μ	μ	μ
A laser cutter (7)	μ	μ	μ	μ	μ

**Q55 How useful to libraries or museums would you consider each of the following elements from the description of makerspaces?**

	Very useful (1)	Fairly useful (2)	Not very useful (3)	Not at all useful (4)
A space in which children can use tools to make objects, tinker and be creative (1)	μ	μ	μ	μ
Tools and/or electronic kits to enable making related to STEM/STEAM activities (3)	μ	μ	μ	μ
Hardware that enables children to create digital texts/artefacts e.g. tablet, PC, camera (4)	μ	μ	μ	μ
Equipment that enables children to learn coding (5)	μ	μ	μ	μ
A 3D printer, and/or 3D printer pens (6)	μ	μ	μ	μ
A laser cutter (7)	μ	μ	μ	μ

**Q56 Have you ever participated in a makerspace as a maker yourself?**

- Yes (1)
- No (2)

**Q57 Have you ever organised a makerspace in your library or museum with children?**

- Yes (1)
- No (2)

**Display This Question:**

If Have you ever organised a makerspace in your library or museum with children? Yes Is Selected

**Q89** Can you describe what kinds of activities have been on offer when you've organised a makerspace?

Display This Question:

If Have you ever organised a makerspace in your library or museum with children? Yes Is Selected

**Q93** When makerspaces are organised in your setting, are they primarily run by members of staff, volunteers, or a mixture of the two?

- Members of staff (1)
- Volunteers (2)
- A mixture of the two (3)

**Q58** How easy would it be to find the following resources for a makerspace in your current setting??

	Very easy (1)	Fairly easy (2)	Fairly difficult (3)	Very difficult (4)
Appropriate funds (1)	μ	μ	μ	μ
Paid members of staff (4)	μ	μ	μ	μ
Volunteers (8)	μ	μ	μ	μ
An appropriate space (9)	μ	μ	μ	μ
Tools and/or electronic kits to enable making related to STEM/STEAM activities (5)	μ	μ	μ	μ
Hardware that enables children to create digital texts/artefacts e.g. tablet, PC, camera (2)	μ	μ	μ	μ
Equipment that enables children to learn coding (3)	μ	μ	μ	μ
A 3D printer, and/or 3D printer pens (6)	μ	μ	μ	μ
A laser cutter (7)	μ	μ	μ	μ

**Q59** How useful would you find it to have training on each of the following?

	Very useful (1)	Fairly useful (2)	Not very useful (3)	Not at all useful (4)
The materials needed for makerspaces (1)	μ	μ	μ	μ
Activities that could be undertaken in makerspaces (2)	μ	μ	μ	μ



How to assess children's learning in makerspaces (3)	μ	μ	μ	μ
Health and safety aspects of makerspaces (4)	μ	μ	μ	μ
Other (please specify) (5)	μ	μ	μ	μ

Q60 What are the principles upon which your educational practice in libraries and/or museums is based? (e.g. your educational philosophy, such as child-centred, active learning etc.)

Q61 How closely do you feel the approaches that could be used to learning in makerspaces align with your educational philosophy?

- Very close alignment (1)
- Somewhat close alignment (2)
- Not very close alignment (3)
- Complete misalignment (4)

Q62 Please tell us a little about why you think this

Q63 Do you have any other comments about makerspaces that could inform our project, at a personal, institutional or national level?

Q75 How old were you at your last birthday?

- 25 or under (1)
- 26-35 (2)
- 36-45 (3)
- 46-55 (4)
- 56-64 (5)
- 65 or older (6)

Q76 What is your gender?

- Male (1)
- Female (2)

Other (please specify) (3) \_\_\_\_\_

Q77 Is this the same gender that you were ascribed at birth?

- Yes (1)
- No (2)

Q78 What is your job title?

Q79 What do you mainly do in your job?

Q80 In your job, did you have formal responsibility for supervising the work of other employees?

- Yes (1)
- No (2)

Q100 What sort of library or museum do you work in?

- Public Library (4)
- School or College Library (5)
- University Library (6)
- National Library (7)
- Natural Science Museum (8)
- Technological/ Computer Museum (9)
- Geological Museum (10)
- History and Civilization Museum (11)
- General Museum (e.g. mixture of above) (12)
- Other (please specify) (3) \_\_\_\_\_

Q81 For how long have you worked in museums/libraries?

- 5 years or less (1)
- 6-10 years (2)
- 11-20 years (3)
- More than 20 years (4)

Display This Question:

If List of Countries United Kingdom Is Selected

Q82 Which of the following qualifications do you have?

- GCSEs (1)
- A-levels (2)
- Apprenticeship (3)
- GNVQ/City and Guilds (4)
- Undergraduate degree (5)
- Postgraduate degree (6)

Display This Question:

If List of Countries United States of America Is Selected

Q98 Which of the following qualifications do you have?

- High school diploma or GED (2)
- Vocational qualification (3)
- Some college (7)
- Associate's degree (8)
- Bachelor's degree (4)
- Postgraduate degree (6)

Display This Question:

If List of Countries United States of America Is Selected

Q103 Which of the following qualifications do you have?

- High school diploma or GED (2)
- Vocational qualification (3)
- Some college (7)
- Associate's degree (8)
- Bachelor's degree (4)
- Postgraduate degree (6)

Display This Question:

If List of Countries Finland Is Selected

Q102 Which of the following qualifications do you have?

- Peruskoulun päättötodistus (1)
- Ylioppilastutkinto (2)
- Oppisopimuskoulutus (3)
- Ammattitutkinto (4)
- Korkeakoulututkinto (5)

Display This Question:

If List of Countries United States of America Is Not Selected

And List of Countries United Kingdom Is Not Selected

And List of Countries Finland Is Not Selected

Q99 Which of the following qualifications do you have?

- School leaving qualification (2)
- Vocational qualification (3)
- Some university education (8)
- Bachelor's degree (4)
- Postgraduate degree (6)

Q83 If you have a professional qualification related to early childhood teaching, please specify it

Q84 Thank you for completing this form!

## SURVEY FOR MAKERSPACE STAFF

Q95 How do you understand the term "makerspace"?

Q36 Do you think makerspaces could be of interest/value for children aged 3-8 where you live?

- Yes (1)
- No (2)

Q37 Please tell us a little more about why you think this.

Q28 Have you ever organised a makerspace in an early years setting (such as a nursery/school) for children aged 8 and under?

- Yes (1)
- No (2)

Q29 Have you ever organised a makerspace in a library or museum for children aged 8 and under?

- Yes (1)
- No (2)

Q30 Have you ever organised a makerspace in any other kind of public space for children aged 8 and under?

- Yes (1)
- No (2)

Q38 Would providing makerspaces for children aged 8 and under be something that you would be interested in doing in the future?

- Yes (1)
- No (2)

Q39 Would you need training in order to provide a makerspace for children aged under eight?

- Yes (1)
- No (2)
- Not sure (3)

Q31 How useful would you find it to have training on each of the following?

	Very useful (1)	Fairly useful (2)	Not very useful (3)	Not at all useful (4)
How makerspaces can be used to foster learning in the early years (6)	μ	μ	μ	μ

Activities that could be undertaken in makerspaces for 3-8 year olds (7)	μ	μ	μ	μ
Health and safety aspects of makerspaces for 3-8 year-olds (8)	μ	μ	μ	μ
Business models for offering makerspaces for 3-8 year olds (9)	μ	μ	μ	μ
Other (please specify) (10)	μ	μ	μ	μ

Q34 Please tell us a little about why you think this

Q87 Do you have any other comments about makerspaces that could inform our project, at a personal, institutional or national level?

Q40 How old were you at your last birthday?

- 25 or under (1)
- 26-35 (2)
- 36-45 (3)
- 46-55 (4)
- 56-64 (5)
- 65 or older (6)

Q41 What is your gender?

- Male (1)
- Female (2)

Other (please specify) (3) \_\_\_\_\_

Q42 Is this the same gender that you were ascribed at birth?

- Yes (1)
- No (2)

Q43 What is your job title?

Q44 What do you mainly do in your job?

Q45 In your job, did you have formal responsibility for supervising the work of other employees?

- Yes (1)
- No (2)

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Q46 Please select all of the following criteria that apply to the makerspace you work in

- Not for profit (1)
- For profit (2)
- Open access (3)
- Fab Lab (4)
- Tech space (5)
- Museum makerspace (6)
- Makerspace in an educational institution (7)
- Other (please specify) (8) \_\_\_\_\_

Q51 How long have you been working in makerspaces?

- Less than a year (1)
- Between one and five years (2)
- Between five and ten years (3)
- Over ten years (4)

Display This Question:

If List of Countries United Kingdom Is Selected

Q47 Which of the following qualifications do you have?

- GCSEs (1)
- A-levels (2)
- Apprenticeship (3)
- GNVQ/City and Guilds (4)
- Undergraduate degree (5)
- Postgraduate degree (6)

Display This Question:

If List of Countries United States of America Is Selected

Q105 Which of the following qualifications do you have?

- High school diploma or GED (2)
- Vocational qualification (3)
- Some college (7)
- Associate's degree (8)
- Bachelor's degree (4)
- Postgraduate degree (6)

Display This Question:

If List of Countries United States of America Is Selected

Q106 Which of the following qualifications do you have?

- High school diploma or GED (2)
- Vocational qualification (3)
- Some college (7)
- Associate's degree (8)
- Bachelor's degree (4)

- Postgraduate degree (6)

Display This Question:

If List of Countries Finland Is Selected

Q107 Which of the following qualifications do you have?

- Peruskoulun päättötodistus (1)
- Ylioppilastutkinto (2)
- Oppisopimuskoulutus (3)
- Ammattitutkinto (4)
- Korkeakoulututkinto (5)

Display This Question:

If List of Countries United States of America Is Not Selected

And List of Countries United Kingdom Is Not Selected

And List of Countries Finland Is Not Selected

Q108 Which of the following qualifications do you have?

- School leaving qualification (2)
- Vocational qualification (3)
- Some university education (8)
- Bachelor's degree (4)
- Postgraduate degree (6)

Q48 If you have a professional qualification related to early childhood teaching, please specify it

Q49 Thank you for completing this form!