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‘Visual tools for sustainable design education’

Final report for ADM-HEA

Dr Vicky Lofthouse

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TABLE OF CONTENTS

Abstract.....	3
Introduction	4
Completion of objective 1.....	5
Key findings.....	5
Completion of objective 2.....	6
Key findings.....	7
Completion of objectives 3 and 4	7
Key findings.....	9
Conclusions	10
Next steps	11
Deliverables.....	11
Appendix A: Proposed issues to be included or excluded from a tool for student designers.....	13
Appendix B: ‘Food for thought’ Checklist	15
Appendix C: Final list of social issues in ‘Food for thought’ checklist.....	16
Appendix D: Social Issues cards	17
References	19

LIST OF FIGURES

Figure 1 The process followed during the project and the key activities undertaken	4
Figure 2 Action shots from the peer review workshop	6
Figure 3 Photograph of a selection of the laminated Social Issues cards.....	8
Figure 4 Students testing the Social Issues cards	9

LIST OF TABLES

Table 1 Potential positive and negative attributes to integrate and avoid in the development of a social sustainability tool.....	6
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ABSTRACT

This report outlines the key steps undertaken in the fulfilment of the ADM-HEA project entitled 'Visual tools for sustainable design education'. It outlines the key activities undertaken in order to meet the research objectives and presents the findings which emerged. The project culminated in the development of a 'Food for thought' checklist and a range of 'Social Issues Cards' which were tested with UK students and found to be valuable resources for raising awareness about social sustainability in undergraduate design students. They offer a design oriented perspective of social issues (which has not been provided before) and have been seen to raise student awareness of social sustainability.

INTRODUCTION

In line with ADM-HEA's 'Education for sustainable development' theme this project aimed to investigate the requirements and identify the attributes of tools to support the **social** element of sustainable design education. Four key objectives are to:

1. Identify limitations of existing tools with respect to supporting the social element of sustainability.
2. Investigate which social issues should be included in a social sustainability tool.
3. Create a tool to support the social element of sustainable design teaching.
4. Test and evaluate the appropriateness of the new tool with design students.

Two key deliverables: literature review and social sustainability tool.

Figure 1 illustrates the process that was followed and the key activities undertaken.

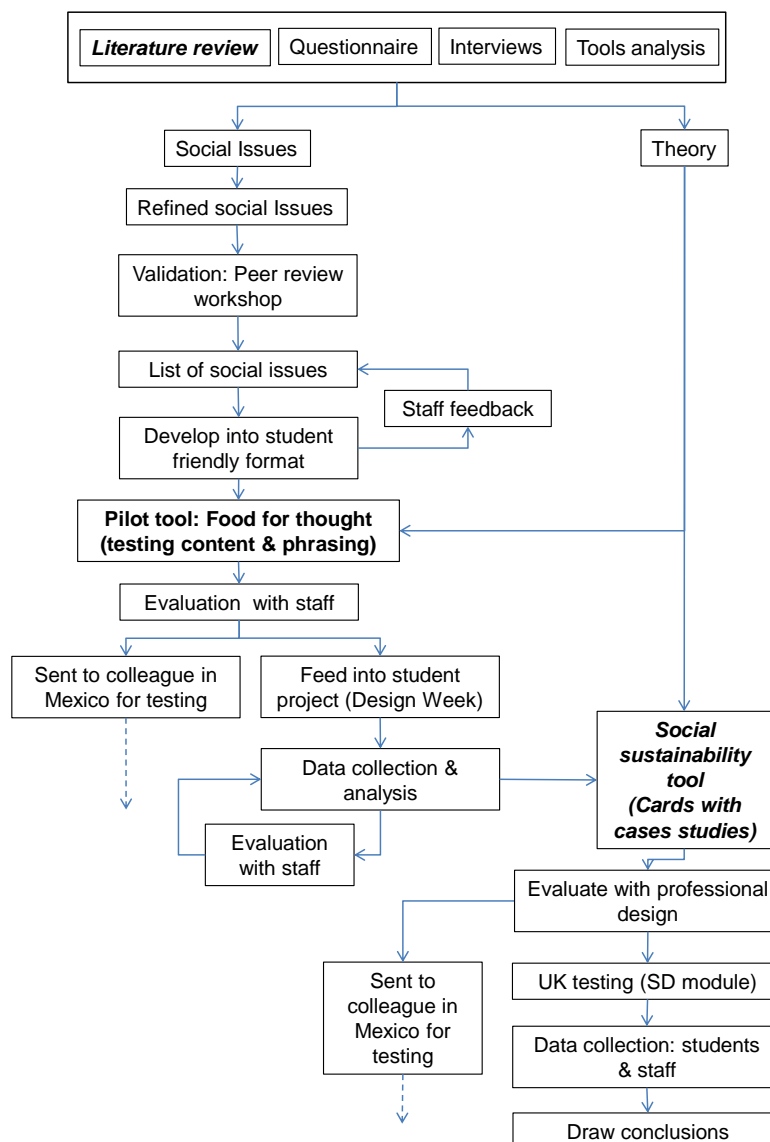


Figure 1 The process followed during the project and the key activities undertaken

The key findings from completing these deliverables will be presented below alongside evidence as to how the objectives for the project have been met.

COMPLETION OF OBJECTIVE 1

Objective 1: **'Identify limitations of existing tools with respect to supporting the social element of sustainability'**, has been met through the completion of a number of activities:

- Observations and feedback from 10 years of teaching sustainable design to industrial designers at Loughborough University.
- Experience of using ecodesign tools with industrial collaborators.
- Online questionnaire sent to approx. 75 academics who teach product design/industrial design to investigate current experiences of teaching sustainable design in British HE.
- 10 semi structured interviews with expert sustainable design academics have been carried out.
- An in-depth literature review has been completed.
- Knowledge developed relating to tools for industrial designers' has been drawn upon.

KEY FINDINGS

- There are no existing tools which are suitable for teaching social sustainability to student product/industrial designers (Lofthouse, 2010a).
- Some of the tools investigated did provide useful guidance re. what social issues are most relevant to designers (supporting objective 2) (ibid).
- Social issues differ to ecodesign issues in that not all issues are going to be relevant to the set brief. As such students need to feel that they can pick and choose the relevant issues to focus on (ibid).
- The lifecycle format of Ecodesign web was not the best way forward for the tool, as was first anticipated.
 - the life cycle focus encourages students to think about issues which are just too far out side of the remit of designers and omits a lot of relevant social issues e.g. emotional durability.
 - the fact that not all social issues will be appropriate to each project – whereas with the ecodesign web encourages as many issues as possible to be considered.
- Other existing tools offer useful attributes which had the potential to be utilised in a social sustainability tool (more effectively than the Ecodesign web). Opportunities offered by 'Information/Inspiration' and the Design Abacus may lead to a more comprehensive tool.
- Positive and negative characteristics for a social sustainability tool were identified (ibid) see Table 1.

Table 1 Potential positive and negative attributes to integrate and avoid in the development of a social sustainability tool

Pros – to consider including	Cons – to avoid
Offer guidance	Need for a reasonable level of prior knowledge
Inspirational case studies	A lack of guidance means students often focus on inappropriate social issues
Educate them / raise awareness	Not clear how to use it
Offer dynamic access	Time intensive for teaching
Be written in a non scientific language	Not easy to apply to real life projects
Visually interesting	Not holistic enough (only focuses on one issue at a time)
Flexible to allow students to consider a wide array of issues	Lack of guidance
Encourage discussion	Unfeasible outputs
Encourage students to think about what issues are appropriate, rather than simply copying them down	Lifecycle focus
Interactive, support learning by doing	
Game element makes it interesting	
Visual reminder – wall chart	
Allows novice designers to compare different characteristics of a product in a better than worse than way	
Can be picked up with a bare minimum of expertise	

COMPLETION OF OBJECTIVE 2

Objective 2: ‘Investigate which social issues should be included in a social sustainability tool’, has been met through the completion of the following activities:

- In depth literature review.
- Online questionnaire sent to approx. 75 academics who teach product design/industrial design to investigate current experiences of teaching sustainable design in higher education in the UK.
- Semi structured interviews with 10 academics working in the field of sustainable design education in British Universities.
- Peer review workshop (see Figure 2).



Figure 2 Action shots from the peer review workshop

KEY FINDINGS

- The literature review did not reveal a definitive list of relevant social issues for designers, though a range of potential issues did emerge (Lofthouse, 2010b).
- The study to date has raised more questions than it has answered, however it may have shed some light on why the social element of sustainable design is not more considered.
 - Social sustainable design issues are both holistic and selective (project specific).
 - The lack of definition and identification re what sorts of social issues designers should be responsible for/influence means that social sustainability has not been made relevant to design.
 - Social sustainability takes a 'needs' focus which is considerably more difficult to implement than the product focus of ecodesign.
- There is a need for a range of different types of tools offering different opportunities, but the fact that social sustainability is a relatively new topic for product design students means that an introductory tool would be very valuable.
- This tool may be more about awareness raising than priority setting, as initially anticipated.
- There is no recognised way of grouping social issues (unlike for ecodesign issues).
- Nine clusters have been identified from the literature review.
- Literature review findings were mapped those from the interviews and surprisingly the number of potential issues for student designers to consider has been reduced.
- The emergent issues were tested for validity in the peer review workshop and the first comprehensive list of appropriate social issues of student designers was compiled (see Appendix A).

COMPLETION OF OBJECTIVES 3 AND 4

As these two objectives are integral to one another and have been considered iteratively they will be considered together.

Objectives 3 and 4: '**Create a tool to support the social element of sustainable design teaching**' and '**Test and evaluate the appropriateness of the new tool with design students**' has been met through the completion of the following activities.

- Early prototyping.
- Peer review workshop.
- Pilot study (Lofthouse, 2011b)
 - Development of 'Food for thoughts checklist' (see Appendix B).
 - Review of checklist by module staff.

- Testing with 120 x 2nd year Industrial/Product design students in Design week project to support the use of the Design Abacus.
 - Analysis of student response to the checklist by reviewing the evidence of social issues in their Design abacuses and drawing out findings.
 - A final checklist of social issues was drawn up based on the findings of the pilot study (see Appendix C).
 - The checklist has been sent to Dr Ricardo Victoria Uribe for testing with undergraduate students in Mexico .
- Prototype social issues tool (Lofthouse, 2011a) see Figure 3.
 - Development of the 'Social Issue Cards' (see Appendix D) using the refined list of social issues.
 - Literature review to identify appropriate case studies.
 - Refinement of the issues to make them appropriate to the cards format.
 - 30 double sided Social issues cards were developed. One side presents a question and the other side presents a case study. Case studies are drawn from both developing and developed countries. 8 sets were printed.
 - Review with professional designer.
 - Testing with 50 x 2nd year Industrial/Product design students enrolled on the elective Sustainable Design module (see Figure 4).
 - The cards have been sent to Dr Ricardo Victoria Uribe for translation and testing with undergraduate students in Mexico
 - Social Issue Cards have been uploaded to the 'Information/Inspiration' website for free download.



Figure 3 Photograph of a selection of the laminated Social Issues cards



Figure 4 Students testing the Social Issues cards

KEY FINDINGS

- The social issues were reformatted for delivery as positive/ negative attributes through the design abacus and as a checklist. It was felt that these could be supported by case study examples, provided through InformationInspiration. In the end a hybrid checklist called 'Food for thought' was produced which asked questions around each of the issues identified to try raise students' awareness of the issues (Lofthouse, 2011b).
- Findings from the pilot study:
 - Use of the checklist encouraged student to integrate new (relevant) social issues into the Design Abacus.
 - The checklist enabled students to identify social issues which were relevant to their brief.
 - Students were naturally drawn towards issues that were relevant to the brief and that they could relate to.
 - The inclusion of issues which had not been seen in student Design Abacuses in the past suggests that the checklist did help to raise their awareness with respect to social issues.
 - The checklist allowed students to recognise that it is not always appropriate to consider all social issues.

- Not providing the actual words to put in to the Abacus meant that students had spend time thinking about the meaning, rather than copying them verbatim.
- The checklist did not stop the students from coming up with things their own social issues, which is a good outcome.
- The flexible format of the checklist meant that new issues could be easily absorbed in future iterations.
- A series of visual cards were proposed for the prototype tool. They were to be based on the social issues identified, and contain illustrative case studies. The cards would provide the visual element, offer dynamic access in a workshop environment, as well as offering inspiration through the case studies provided, which would help to demystify the process and demonstrate how each of the issues can be considered by designers (Lofthouse, 2010a).
- Findings from the testing of the prototype tool – ‘Social Issues cards’
 - All of the findings from the pilot study (listed above) were seen to be true for the ‘Social Issues cards’. In addition it was seen that:
 - The cards and the checklist together proved to be a useful combination.
 - The visual nature of the cards in terms of the examples and the fact that they could be played with, was well received by the students.
 - In general the students liked the examples on the cards. A number specifically stated that they found them to be inspirational. It was identified however, that examples **MUST** be relevant to product design to be valuable and therefore need to be carefully selected. Selection of inappropriate case studies can lead to disillusionment.

CONCLUSIONS

As a result of the study, a much clearer understanding of the types of social issues which are appropriate to student industrial designers has been identified. This will have benefits for teaching the subject in general and will also provide staff using the Design abacus with a ‘crib sheet’ of typical issues for student to utilise. The project has open up the debate as to what social issues are appropriate to student industrial designers and identified that the whole gamete of social issues often thrown at student designers can have a negative effect on their engagement with the issues.

In general both the students and the staff found the ‘Food for thought’ checklist and the ‘Social Issues’ cards to be valuable resources for raising awareness about social sustainability in undergraduate design students. They offer a design oriented perspective of social issues (which has not been provided before) and have been seen to raise student awareness of social sustainability. They are a complementary resource for supporting the Design abacus – which is well placed to allow student to consider a wide range of sustainable design issues. Though the intention was that the ‘Social Issues’ cards be the main output of this project, the suggestion of benefits from providing both tools in combination means that they will both be uploaded onto the 'Information/Inspiration' website for others to access.

There is potential for these resources to be fairly easily translated into other languages, the checklist has already been successfully translated and is being tested. The cards will be translated ahead of being tested by colleagues in Mexico.

Though the cards are quite time consuming to initially prepare when a large number of groups are involved (e.g. 8 groups x 30 social issues cards), and there is a cost involved. Once they have been created they are available for future iterations, and were considered to be worth the investment.

NEXT STEPS

- Test and evaluate the appropriateness of the Social Issues cards with design students in Mexico – examples will need translating. This will be delayed slightly due to the different terms times in Mexico.
- A journal paper focused on 'Identifying relevant social issues for student designers' is planned for Design and Technology Education: an International Journal, published by Trentham Books Limited.
- A journal paper focused on 'Tools for social sustainability in undergraduate design education' is planned for the International Journal of Technology and Design Education published by Springer.

DELIVERABLES

- Interim report
- Seven internal reports:
 - LOFTHOUSE, V.A. (2010) Visual tools for sustainable design education. Objective1: Analysis of existing tools to identify lessons for the development of a tool for social sustainability, Internal report ADM-HEA:001, 23rd August 2010
 - LOFTHOUSE, V. (2010) Visual tools for sustainable design education. Objective 2: Literature review for ADM-HEA, Loughborough, Loughborough University. Internal report ADM-HEA:002, 18th October 2010
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- LOFTHOUSE, V.A. (2011) Internal report: Pilot study, Internal report ADM-HEA:006, 8th March 2011
 - LOFTHOUSE, V. (2011) Visual tools for sustainable design education. Internal report: Development and testing of social sustainability tool Loughborough, Loughborough University ADM-HEA:007, 15th March 2011.
- 'Food for thought' checklist
 - 30 Social Issues cards
 - Final report

APPENDIX A: PROPOSED ISSUES TO BE INCLUDED OR EXCLUDED FROM A TOOL FOR STUDENT DESIGNERS

Proposed issues to included...	Proposed issues to be excluded...*
Does it improve health and well being?	Is it designed to be inclusive / universal?
Does it encourage participation and belonging?	Does it stimulate the senses?
Does it encourage empowerment and promote human competence?	Is the product appropriate for the society and culture it will be used in?
Does it enhance social interaction, communication and engagement?	Will it encourage the maintenance of traditional knowledge and skills?
Does it enrich users' lives or increase quality of life for all?	Will it maintain social or cultural traditions?
Does it promote happiness?	Is it created in collaboration with stakeholders?
Is it actually needed?	Will it be fair trade?
Is the brief ethical?	Will workers have fair working conditions?
Does it encourage a sense of community?	Does it support learning and understanding?
	Is the product responsible?
	Is it locally produced?

Proposed issues to be excluded...*	Summary of the reasons as to why they were excluded...
Is it designed to be inclusive/ universal?	Although recognised as a relevant social issue for designers, it is a well supported issue & commonly addressed in design practice and therefore wasn't included.
Does it stimulate the senses?	This was only identified as a relevant issue by 1 author so was not included.
Is the product appropriate for the society and culture it will be used in?	Experts recognised the need to keep a design focus, & this issue was seen to be outside the control of student designers, also it is difficult to envisage where a product might be used (e.g. mobile phones).
Will it encourage the maintenance of traditional knowledge and skills?	Outside the remit of student designers.
Will it maintain social or cultural traditions?	Outside the remit of student designers.
Is it created in collaboration with stakeholders?	Though widely discussed, it was recognised that despite its good intentions, it was not always viable, & due to its context specific nature, may not always be desirable.
Will it be fair trade?	Only really appropriate for coffee, tea, chocolate and bananas.
Will workers have fair working conditions?	Outside the remit of student designers.
Does it support learning and understanding?	Though highlighted in the literature, it was felt this could be covered elsewhere & it had limited relevance to student designers. It did not feature in the interviews.
Is the product responsible?	It was felt that including this suggested that normally design wasn't responsible. This also led to issues re "who can say what is responsible or not". Therefore it has been left out for being too subjective & potentially covered by other issues.

Is it locally produced?	Not everything can or should be produced locally (cars, domestic appliances, plastics etc.).
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Think about social issues, consider:

- How could your design improve health and well being?
- How could your design encourage participation and belonging?
- How could your design encourage empowerment?
- How could your design promote personal abilities?
- How could your design enhance social interaction?
- How could your design enhance communication?
- How could your design enhance social engagement?
- How could your design enrich users' lives?
- How could your design increase quality of life for all?
- How could your design promote happiness?
- Is the product actually needed?
- How could your design encourage a sense of community?
- How could your design maintain local/ cultural traditions?
- Other....

Which of these issues could you feed into your Design abacus?

Think about social issues, consider:

How could your design improve health and well being?

How could your design encourage participation and belonging?

How could your design encourage empowerment and promote human competence?

How could your design enhance social interaction or engagement?

How could your design enhance communication?

How could your design enrich users' lives and increase quality of life?

How could your design promote happiness?

How could you design demonstrate the values of the user?

How could your design create an emotional bond with the user?



















Is the product actually needed?

How could your design encourage a sense of community?


How could your design maintain local/ cultural traditions?

Other...

APPENDIX D: SOCIAL ISSUES CARDS

<p>Does it improve health & well being?</p>	 <p>Water for People The mission is to provide clean water and sanitation to people in need. We are currently working on projects in Africa, Asia, and Latin America. www.waterforpeople.org</p>	<p>Does it improve health & well being?</p>	 <p>Ushahidi Ushahidi is a social network for crisis response and disaster relief. It allows people to report and track crises in real-time. www.ushahidi.com</p>	<p>Does it improve health & well being?</p>	 <p>LET'S MOVE! Let's Move! is a national campaign to get more children moving and eating better. It's a partnership between the U.S. Department of Health and Human Services and the U.S. Department of Education. www.letsmove.gov</p>
<p>Does it improve health & well being?</p>	 <p>MapIt MapIt is a social network for people who are interested in maps. It allows people to share and discover maps. www.mapit.com</p>	<p>Does it encourage participation & belonging?</p>	 <p>Meet Meet is a social network for people who are interested in meeting other people. It allows people to find and connect with others. www.meet.com</p>	<p>Does it encourage participation & belonging?</p>	 <p>Facebook Facebook is a social network for people who are interested in connecting with others. It allows people to share and discover content. www.facebook.com</p>
<p>Does it encourage participation & belonging?</p>	 <p>Facebook Facebook is a social network for people who are interested in connecting with others. It allows people to share and discover content. www.facebook.com</p>	<p>Does it encourage empowerment & promote human competence?</p>	 <p>Meet Meet is a social network for people who are interested in meeting other people. It allows people to find and connect with others. www.meet.com</p>	<p>Does it encourage empowerment & promote human competence?</p>	 <p>Ushahidi Ushahidi is a social network for crisis response and disaster relief. It allows people to report and track crises in real-time. www.ushahidi.com</p>
<p>Does it encourage empowerment & promote human competence?</p>	 <p>Ushahidi Ushahidi is a social network for crisis response and disaster relief. It allows people to report and track crises in real-time. www.ushahidi.com</p>	<p>Does it enhance social interaction, communication & engagement?</p>	 <p>Meet Meet is a social network for people who are interested in meeting other people. It allows people to find and connect with others. www.meet.com</p>	<p>Does it enhance social interaction, communication & engagement?</p>	 <p>Ushahidi Ushahidi is a social network for crisis response and disaster relief. It allows people to report and track crises in real-time. www.ushahidi.com</p>
<p>Does it enhance social interaction, communication & engagement?</p>	 <p>Ushahidi Ushahidi is a social network for crisis response and disaster relief. It allows people to report and track crises in real-time. www.ushahidi.com</p>	<p>Does it enrich users lives or increase quality of life?</p>	 <p>Ushahidi Ushahidi is a social network for crisis response and disaster relief. It allows people to report and track crises in real-time. www.ushahidi.com</p>	<p>Does it enrich users lives or increase quality of life?</p>	 <p>Ushahidi Ushahidi is a social network for crisis response and disaster relief. It allows people to report and track crises in real-time. www.ushahidi.com</p>
<p>Does it enrich users lives or increase quality of life?</p>	 <p>Ushahidi Ushahidi is a social network for crisis response and disaster relief. It allows people to report and track crises in real-time. www.ushahidi.com</p>	<p>Does it enrich users lives or increase quality of life?</p>	 <p>Ushahidi Ushahidi is a social network for crisis response and disaster relief. It allows people to report and track crises in real-time. www.ushahidi.com</p>	<p>Does it promote happiness?</p>	 <p>Ushahidi Ushahidi is a social network for crisis response and disaster relief. It allows people to report and track crises in real-time. www.ushahidi.com</p>

How could your design demonstrate the values of the user?



Prosthetics
 Designing prosthetics is often a very complex task. It is an interdisciplinary field that requires a deep understanding of the user's needs, the materials used, and the manufacturing process. The design must be functional, comfortable, and aesthetically pleasing. It is a field that is constantly evolving, with new materials and techniques being developed all the time.

19


How could your design demonstrate the values of the user?



Porridge of the World
 Porridge is a traditional food that is eaten in many cultures. It is a simple, nutritious, and comforting food. The design of a porridge pot should be functional, durable, and easy to use. It should be able to cook porridge evenly and efficiently, and it should be easy to clean and maintain.

20


How could your design demonstrate the values of the user?



Prayer Beads
 Prayer beads are a traditional religious artifact used in many cultures. They are used to count prayers and to focus the mind. The design of prayer beads should be functional, durable, and aesthetically pleasing. It should be easy to use and it should be able to hold up to frequent use.

21

How could your design create an emotional bond with the user?



Big Black Bear
 The Big Black Bear is a traditional Scottish toy. It is a large, dark, textured bear that is used to comfort children. The design of the bear should be functional, durable, and aesthetically pleasing. It should be able to provide a sense of comfort and security to the user.

22


How could your design create an emotional bond with the user?



Yak's by the River
 Yak's by the River is a traditional Scottish craft. It is a small, wooden boat that is used to transport goods and people. The design of the boat should be functional, durable, and aesthetically pleasing. It should be able to provide a sense of connection to the user's heritage and culture.

23


How could your design create an emotional bond with the user?



Tamagotchi!
 Tamagotchi is a traditional Japanese toy. It is a small, colorful, round creature that is used to provide a sense of companionship. The design of the Tamagotchi should be functional, durable, and aesthetically pleasing. It should be able to provide a sense of connection to the user's culture and heritage.

24

Is it actually needed?



Shiraz and the Sultans
 Shiraz and the Sultans is a traditional Scottish toy. It is a small, colorful, round creature that is used to provide a sense of companionship. The design of the Shiraz and the Sultans should be functional, durable, and aesthetically pleasing. It should be able to provide a sense of connection to the user's culture and heritage.

25

Is it actually needed?



Tiger and the Lion
 Tiger and the Lion is a traditional Scottish toy. It is a small, colorful, round creature that is used to provide a sense of companionship. The design of the Tiger and the Lion should be functional, durable, and aesthetically pleasing. It should be able to provide a sense of connection to the user's culture and heritage.

26


Does it encourage a sense of community?



Play Day
 Play Day is a traditional Scottish social activity. It is a time when people come together to play and socialize. The design of Play Day should be functional, durable, and aesthetically pleasing. It should be able to provide a sense of connection to the user's culture and heritage.

27

Does it encourage a sense of community?



Small world
 Small world is a traditional Scottish toy. It is a small, colorful, round creature that is used to provide a sense of companionship. The design of the Small world should be functional, durable, and aesthetically pleasing. It should be able to provide a sense of connection to the user's culture and heritage.

28

Does it encourage a sense of community?



The Green and the Red
 The Green and the Red is a traditional Scottish craft. It is a small, colorful, round creature that is used to provide a sense of companionship. The design of the Green and the Red should be functional, durable, and aesthetically pleasing. It should be able to provide a sense of connection to the user's culture and heritage.

29

How could your design maintain local/ cultural traditions?



Little Black and the Red
 Little Black and the Red is a traditional Scottish craft. It is a small, colorful, round creature that is used to provide a sense of companionship. The design of the Little Black and the Red should be functional, durable, and aesthetically pleasing. It should be able to provide a sense of connection to the user's culture and heritage.

30

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