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“Roadmap” for new learning and communication architectures of technology-enhanced public spaces for intergenerational ludic learning scenarios in informal contexts

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Summary

This roadmap covers the findings of La Piazza, a 12 month collaborative project to investigate the potential for research in intergenerational learning in technologically enhanced public spaces.

From an exploration of literature we find that generations are much farther apart today in spatial, emotional and cultural terms than before. Groups begin to be institutionally segregated- for instance by our construction of childhoods within an institutional framework or the social security systems defining the experience of old age and on the other hand, the increased development of a “youth culture” which widens the gap between young and old. However contrary to this trend, meaningful activities, together with others, seems to be a condition for wellbeing of all in society.

From our workshops with actors in the field we have developed a framework of key factors:

- * Space-time: we need to take into account of the ways different generations work in space and time
- * Traces and trails / routines and rituals: people develop their own habits of navigating through space and time- we need to help people to develop new routines that enable the intersection of their journeys.
- * ME ++ (self-expansion, personal growth) People need to develop voice in many modalities – including modalities afforded by new technologies – so that they can both develop their identity and be heard.
- * Togetherness (relating to other, us / them) — As a member of a socio-cultural community, a person’s identity has much to do with becoming an active and respected member of a group.
- * Dream space: Imagine, Create! Dream it up and make it happen! Systems to empower people’s creativity.

We also describe necessary conditions and research that may be required to develop or implement technologies that allow people good interaction in space-time and the requirement for research which configure automatically in the contexts we propose. These include personally owned technologies like mobile phones, physical technological artefacts in the environment and the wireless network, and its data, which increasingly pervades metropolitan space.

Finally we complete the roadmap with a list of 17 questions we pose for future research and suggestions for research infrastructure that will enable further socio-cultural research in technologically enhanced public spaces.

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1 Introduction

La Piazza is about intergenerational learning in public places that are enhanced by technology. This could be a museum or gallery, a jazz summer school or a computer club - or it could be a piazza. How can people from all generations learn from each other and how can space and technology help?

1.1 Outline

It is generally agreed that the current model of technology-enhanced, collaborative public spaces, as used in community centres and museums, needs to be enriched if it is to truly engage users. La Piazza is part of the European research network Kaleidoscope, whose participants have come together to exchange ideas and to explore the issue of intergenerational learning in public spaces using technology.

Existing technologically-enhanced public spaces do not normally cater for adults playing an active role as mentors. The main idea behind the La Piazza project is for community centres and alike to promote learning between generations. Both adults and young people are producers of knowledge and culture, and so a process of mutual learning would be beneficial to all.

The growing importance of intergenerational learning could be attributed to the demographic trend towards an ageing population, with an increasing number of policies to support life-long learning both in formal and informal settings. However, while there has been much research to explore the benefits derived by adults and young people involved in intergenerational learning, the role that technology-enhanced public spaces can play in maximizing those benefits remains largely unexplored.

La Piazza aimed to research and develop:

1. Intergenerational learning scenarios supported by technology in public social spaces, where learning takes place across ages through meaningful social interactions.
2. Integration of technology interfaces and tools into the physical architecture of those public spaces, to support meaningful and playful intergenerational learning activities.

Another dimension of the project has been a consideration of the role of space in learning. Learning activities mediated by technology do not happen in a spatial void. The design of physical space has an enormous effect on the way we, as human beings, behave and on the activities that we undertake. Our perception of space is subjective and can influence the way we think and construct knowledge. It is important to design spaces that are sensually rich and stimulating (using light, colours, smell and touch), as these qualities affect the learning process.

Beyond being a convivial space, a place where people come together, a piazza is a transitional zone, a place between home and work where people of all ages come and go. And so its identity is forever changing, reflecting the varying personalities of its members. Inspired by the nature of piazzas, the La Piazza project contends that

a learning space should also be evolving, reflecting the needs of its changing audiences.

1.2 Research Objectives

Through the exploration of public spaces and the development of learning activities for adults and young people, using case-studies and participatory design sessions, La Piazza project has sought to:

- Explore the issue of intergenerational learning mediated by technologies in social spaces.
- Define a model for intergenerational learning in public spaces, enriched by technology, to support a range of cognitive and societal competences as well as differing ways of self-expression.
- Explore architecturally interesting social spaces, in which technologies are ecologically integrated, where adults and young people can participate in a mutual, socially-rewarding learning experience.

1.3 Research Outcomes

The overall aim of this project has been to establish a comprehensive research roadmap represented by this document on how, under what conditions and with what social benefits, technology-enhanced public spaces can effectively and meaningfully support intergenerational learning. More specifically the project will produce:

- A literature review, providing an exploration of the research undertaken in this area. This publication will offer a clear vision of where gaps in our understanding lie, where our knowledge base is weakest and future directions we need to follow to make best use of technology for intergenerational learning.
- A set of case studies
- Suggestions for future research based on workshops to explore new methodologies in the design of technology-enhanced learning spaces.

In this publication we explore a number of research considerations that have been significant for the Piazza network. In section 2 we explore the research questions that relate directly to the importance of intergenerational learning. In section 3 we offer our analysis of what we learned in our case studies and examples. In section 4 we consider the issues relating to technology and space.. In the final section we present some directions for future research in this very interesting and salient domain

2 Why Intergenerational Learning?

Much of the rationale in education literature is based on a societal need and historical evolution of generations' separation: The case is made that generations are much farther apart today in spatial, emotional and cultural terms than before. Groups begin to be institutionally segregated- for instance by our construction of childhoods within an institutional framework or the social security systems defining the experience of *old age*.

Theories of aging stress the need for elderly people to be more connected with society. This can be interpreted as engaging in meaningful activities, together with others, and it is a condition for their wellbeing. On the other hand, the increased development of a "youth culture" with a life of its own is seen as evidence of the widening gap between young and old (Loewen, 1996¹). In short, retirement villages entrench the elderly on one end of the generational spectrum, while MTV and the advertisement industry generate a "youth culture" and entrench the younger generations at the opposite end of this spectrum.

2.1 What makes programmes (IGP) successful?

Loewen (1996) gathers the most effective elements from approximately twenty programmes of IGP (intergenerational programme) into five categories serving as criteria for intergenerational programmes:

Curriculum based: by basing IGP within the school curriculum two things happen – the activity is given value, and devoted significant time to; - the activity is constructed by the teacher from an "optimal learning perspective".

Relationship based: a structure is required. Also programmes need time for personal connections to be developed between students and adults

Reciprocal relations: to achieve optimal learning, both adults and adolescents can offer expertise, and the learning process should be as dynamic as possible. In the best programmes the lines between those served and those serving are blurred to the point of irrelevance.

Community based: involving students in a community of practice, based on real community issues.

Authentic work: final product relevant and worthy of great mental and physical energy, not only focused on the pleasure of meeting.

¹ Loewen, J. (1996). Intergenerational learning : what if schools were places where adults and children learned together. Report. EDRS

3 Designing for Intergenerational Learning

Piazza adopted a *design with stakeholders* approach to addressing practical questions around the issues. In the first instance we pooled our existing practice and provided comparative case studies of current experiences. We then worked with the active involvement of stakeholders in the field - some of whom had been participants in the activities described in the case studies. These actors were mainly drawn from leaders of educational activities in various public spaces across Europe. Working with these people La Piazza team investigated specific design approaches to explore our key objectives.

Two co-design workshops involving stakeholders and project members were a key step in the methodology envisaged by La Piazza. The co design sessions provided us with a test bed to examine **key dimensions** we had identified through literature review and a comparison of our empirical practice. The key dimensions were:

- Role of the physical space in supporting the interactions among people
- Integration/interaction of physical space and digital space
- Contents as a trigger to foster the exchange and the learning process as a process of co-construction of (new) knowledge
- Tools and objects can provide the reason for cooperating and interacting among people of different ages and for experiencing relations with the past
- “practices and habits” and the concept of “history” as a collection of traces and memories settled in the space and in the society allow the identification of the temporal dimension as an asset to explore together in the observation of their evolution
- The role of the concept of “identity” as a personal or group identification mark as well as a opportunity to identify the differences as a source of values, knowledge and meeting
- Intangible and unrecognizable representations (shadows) as a trigger for spontaneous and fortuitous encounters and exchanges as well as for a simpler identification with the others facilitating the process of “putting themselves in others’ shoes”
- The challenges (of a game, a contest,...) as a stimulus for creating collaborative activities and recognising the potentiality of the team as a sum of different people with different skills, knowledge, perspectives,...

The project took inspiration from commercial design practice of the international design group IDEO². We produced workshop formats that allowed a breadth of thinking in playful ways around the contexts of generations and space. These workshops were supported by *inspiration cards* which presented the key dimensions and were used at a workshop in Barcelona. Our development of the dimensions was further refined by a design workshop in Liege.

² See www.ideo.com

The dimensions were presented as a tool to provide inspiration and to reflect upon and enhance intergenerational learning activities. The dimensions express some of the aspects we identified as relevant and promising for further applicative design processes.

The ludic approach of the activities planned in the two sessions allowed the creation of design ideas in an ideal situation for stimulation the creativity, where judgment was suspended and the participants felt free to propose and share their ideas with one another. We observed that, in spite of a first reluctance in thinking freely of constraints such as budgets and technology availability, the participants enjoyed the exercises and produced effective reflections to focus on.

From the workshop experiences we were able to define the actions we would want to pursue further:

- Exploit the potential of the dimensions identified, further refine them and deepen their contextualisation
- Map our co-design results, the Piazza literature review and the results of the contexts' analysis to identify new possible dimensions to explore
- Define the enabling technologies suitable for the concepts generated and envision their implementation in authentic contexts
- Define the specific activities to support in the scenarios envisioned and evaluate their potential for enhancing learning processes

As the last bullet point suggests, there is a strong case for undertaking the activities implied above to have good research over the whole process from concept design through to realisation in order to understand methodology as well as product.

4 What was learned from Piazza case studies

The fragments below have been extracted from interviews in Liège (MAMAC), and selected for their ability to encapsulate the essence of what many other practitioners in the site were thinking, and have expressed. The chosen quotes cannot possibly do justice to the richness of the ideas expressed. For a more exhaustive presentation of interviews, refer to report³.

Time — An interviewee (artist, practitioner in intergenerational work) stressed that a key to success is giving due importance to the reflection on the issue of time(s). “Individual times are different between generations. One needs to design collective times, and create rhythms. But one also should allow for intra- and intergenerational moments. If people are put together too quickly, one loses in the richness of the encounter (...) Intergenerational activities can’t be time-efficient or product-driven: They are inversely proportional to the demands of the current era! These projects must have disproportionate ambitions in time, history, and at the same time a very great humility in terms of result”.

Space — Enabling spaces for intergenerational learning are described by another practitioner as: “convivial spaces for encounters, discoveries, and questionings” of community-related archives. They are informal settings, broad-minded, that call for dedicated areas, or agora, focusing on freedom of exploration and expression (...). They tap into a community’s living memory”.

Networks — [expanded time-space, connectedness] The same practitioner stresses the importance of being part of a network, while still anchored in the here-and-now: “To build such communities means using pre-existing networks (...) in every transmission the path has to be indicated (...) then the encounters can create new networks, facilitating intergenerational meetings”. In today’s world, the young are connected to many on-line networks, yet they don’t always feel grounded or in touch with others.

Journeys — [from actual to possible, from past to future] – Contemplating “how things could be” is further mentioned as playing key role in defining a person’s identity. The same practitioner continues: “the idea is to work with the young—or the elder—on observation of trivial reality and then convene their imagination (...) they have to know from where they start to express themselves and be conscious of that. Often people borrow their identity from pre-formatted discourses”.

Speaking beyond words — [“Cultural baths”]. We need “meeting places that encourage personal expression not only through discourse but through artistic means, Mingling in a cultural bath where things are shared through perfume, colours, sounds, music, people would understand each other beyond words”.

Recurring themes from interviews and the responses to our concept cards have been grouped 5 categories, which refined our understanding of the dimensions, to be taken into account when designing or facilitating events and spaces for intergenerational learning.

1. Space-time *Take your time and find your place.*

³ See http://161.116.88.107/la_piazza/

People don't usually separate time and space the way scientists do.

The word "chronotope" (Greek for time/space) captures the notion that in human experience, place is tied to events, i.e., evocative of what happened in it over time. Conversely, timely events are associated with, and evocative of, place. Intergenerational learning calls for dedicated space/times that enable shifts between private and public, comfort and challenge, "connivance" and inclusiveness (like-minded and extraneous). Time and place are experienced differently at different ages, and so are levels of tolerance for "filled" versus, "empty" time/space (noisy/silent, crowded/void, fast/slow).

2. Traces and trails / routines and rituals — *Keep track and come back.*

In Casey's words, "*Who we are*" is "*where we are and when we are*"⁴. For people to exist, physically and mentally, in time and space we need to find our way around - (navigating) and keeping a bearing (having a direction or destination) in real and abstract senses. Traces and trails are *self-orienting devices* that help people in transit—or minds in motion—be grounded and capable of return. Developing routines and rituals are a significant part of the process.

They also convey identity to place itself (genius loci), and stimulate a sense of belonging by the people who contributed to the construction of its identity

3 ME ++ (self-expansion, personal growth) *Tell your tale / find your voice.*

Identity formation is about staying in touch with what one feels, perceives, understands and likes. It also involves an ability to speak one's mind, and be heard. Bruner suggests that stories happen to those who know how to tell them. Early on, children learn to tell their tales to those willing listen, and they soon become silent if their gift is not heard. People, young and old, speak in a hundred languages to express themselves (words, gestures, humour, music) [6]

4. Togetherness (relating to other, us / them) — *Belong and be loved. Mingle and share.*

As a member of a socio-cultural community, a person's identity has much to do with becoming an active and respected member of a group. It also has to do with being able to negotiate differences. Intergenerational encounters are a means for old-timers and newcomers to reshape their roles in society, define a new identity for themselves, and regain a voice as a group.

5. Dream space: Imagine, Create! *Dream it up and make it happen!*

The future belongs to those who invent it! Making dreams come true is a key to both personal and societal growth. Envisioning possibilities, or gauging *what is* in terms of *what could be*, opens new horizons and sheds different light into one's reality. Imagination naturally occurs in make-believe activities, such as storytelling, or play. Creativity reigns in the mind of the artist. Intergenerational learning can be about making us all connected artists.

⁴ E. Casey. *The fate of place: a philosophical history*. University of California Press (1997).

The table below describes a mapping from a conceptual frame to a design guideline.

Dimensions	As experienced	Example	Lessons for design
Space-time	Chronotope.	Sun-dials	Time-aware spaces, spatially grounded moments
Self (expanded)	ME++ There's more to me than my individual self, here and now	Me as I was (past) Me as I will be (future) Me as I 'd like to be Me when I go there. Me when I am here	Design stages / events to boost personal expression, self-expansion, and identity formation. Ex: story telling; performance
Us (relations)	Connectedness Empathy Dance/dialogue	Me seen through other Other seen through me Many kinds of others	Design stages / events for Sharing, trading, dancing Ex. Become other/carnival
Dream-space	Envision new horizon. Open possibilities. Invent future	How I wish things were How things could be Fictionalize. Dramatize Think out of the box	Design stages / events for Co-creation, co-invention, Building fictions together Theatre. Poetry. Story-telling

5 Technologies for enhanced public spaces

The developments of technology that can enhance experience in a public space are developing rapidly. This fact, of course, is one of the reasons why the concepts in Piazza are interesting. Because the technological capabilities are changing we present a model of the ways that people and technology can interact with space and illustrate with few contemporary activities. However such is the development that they may already be out of date by the time you read this publication.

5.1 The technological issues

We can identify a number of dimensions that can be problematised for research and development processes:

- The pervasive overlay: an electronic sea of information provided by a wireless network available to you wherever you are.
- Technology in the space or Technology you bring to the space: in some cases there is technology in the space you visit in other cases you bring the technology with you into a space such as a mobile phone
- Technology that provoke or scaffold conversations or technologies that mediate conversations: in some cases technology is there to make you imagine virtual or abstract possibilities in other cases it is there to promote conversation about real things already in the space
- Augmenting the space or making the space a different place – in some cases the IT in the space tells you about the space as it is, in other cases we can make the space virtually somewhere else.
- Synchronous interaction or asynchronous interaction: Sometimes the interaction with other people is when people are in the same space at the same time- in other cases it may be that the interaction is with knowledge left by a person at some other time – or the visitor may leave information for others to act on in the future.
- Deliberate and casual – sometimes you may visit a space deliberately to have a specific experience and in some cases you may just happen upon an experience.

Any given instance of a planned intergenerational learning activity may include some or many of the above dimensions.

5.2 The Pervasive Overlay

In the metropolitan environment it is now taken for granted that we can have continuous wireless access to the internet and the services it provides. There are continual improvements in wireless internet technology increasing the quality and amount of information that we can transmit. We have technology to deliver our selection of on-demand video or audio material. This can come via the mobile phone network or through wireless networks in “hot spots”. The limiting factor is cost. Currently this technology is expensive to acquire and expensive to use,

however there will undoubtedly be new business models that will drive down costs or move costs from direct consumption to models based on public service or advertising etc. Further information about mobility and technology in Europe can be found at the emobility website <http://www.emobility.eu.org/>

There are other dimensions other than the provision of mobile access to the internet. There are also technologies which will enable locating the individual in space which can enhance the experience in that space. In the open air we can use personal geographic positional systems. These will be able to locate an individual within a few metres of accuracy. The European system, Galileo by the end of the development phase (2003-2008) will launch the first four of a total of 30 operational satellites. However the main envisaged use is not for personal or social location based services. A recent EU⁵ final suggests the use will be the transmission of warning messages or for the transportation of animals, or the carriage of dangerous substances, etc. There is little mention of inventive location based demand services. In education there are some services being developed⁶

In cities the location resolution of mobile phone calls can be as close as 50m although in rural areas this may be 10Km. This is hardly sufficient for highly targeted information based activities however there might be some inventive possibilities. Currently the service providers are more interested in developing services that are under their direct control rather than opening the system up for innovative exploitation.

Indoors there are other technologies that are emerging from embedded sensor networks- small computers with wireless communication that can be built into any environment. These have been developed mainly for industrial and military applications – remotely collecting data or keeping check on objects in space. However we can make a social space *live* with these technologies. If an individual also has one of these sensors about their body then the sensor network can locate the wearer very accurately. These can position an individual in a museum or gallery in relation to an exhibit and deliver personalised information for instance. They may also be embedded in *networked jewellery* (discussed below) to enhance social interaction.

Location in space technology is an important technology. If the “system” has knowledge of where you are then you can demand information that is salient to your current circumstances. Currently the business and development model offered is not based on salience or demand. Most providers of location based information are still operating on a broadcast-service-provided information system. This may tell you about large commercial actors (like chain restaurants) rather than the more

5 COM(2006) 272 final. Communication From The Commission To The European ... EGNOS

ec.europa.eu/dgs/energy_transport/galileo/documents/doc/comm_pdf_com_2006_0272_en.pdf

6 (see www.createascape.org.uk and the COLLAGE EU project

<http://ec.europa.eu/education/programmes/elearning/projects/2005/collage.pdf>

personalised information you may demand. Some of these are described in Owen (2006) ⁷

5.3 Technology in the space – Technology you bring

Some intergenerational learning activities in locations take place because they involve a space where the technologies are set up for that purpose. In our Piazza case studies for instance we have a case of computer clubhouses set up as technologically rich spaces for computer oriented activities to take place. Similarly the Space Signpost is an art/science/technology installation in a public space where people can specifically go to interact with the technology. These become more focussed on the technology (and there is no negative imputation in that). However as we carry more and more sophisticated mobile devices around our body it may be that any location becomes available as a place of technological by the technology we bring to the space. The mobile phone and the handheld computer are obvious – but the use of small embedded intelligent electronics can make many less obvious devices technologically enhance the environment. Kettley (2005)⁸ describes a system of networked jewellery. She describes how ordinary jewellery- along with other adornment – effects social space. How you dress in specific spaces sends out signals about yourself. However with intelligent jewellery (based on embedded controller technology) she suggests that there are new levels of interaction. A foremost level is in identifying others – people who are friends of friends for instance – who may be willing to interact without formal introductions etc. However we may look further as the jewels themselves may also be the information carriers.

There is a suggestion that we may need to develop space operating systems (see for instance Johansen et al (2002))⁹. In our road map we see the need for a space operating system to resolve four issues. First there needs to be a configuration of the technology in the space in relation to the technology you bring into the space. Secondly there is a configuration of the technology you bring into the space in relation to the space. Thirdly there are issues of security and privacy in the network. Finally there are issues that are about the context the individual brings to the situation –identity, needs and demands etc.

5.4 Technology to Provoke or Scaffold Conversations

These are not mutually exclusive. We have discussed elsewhere in this roadmap that the co-design process of enhancing space with technology could both be the process and outcome of learning. However the distinction we are suggesting is that some technologies may be applied for generating a new experience and discussing and learning from that experience may not involve further use of technology. A good example is the development of a wireless-wearable delivery of a drama (see

⁷ see (http://www.futurelab.org.uk/research/opening_education/social_software_17.htm#appendix1)

⁸ Visualising Social Space with Networked Jewellery

www.soc.napier.ac.uk/publication/op/getpublication/publicationid/7894758

⁹ <https://graphics.stanford.edu/papers/iwork-overview/iwork-overview.pdf>

The Interactive Workspaces Project: Experiences Ubiquitous Computing Rooms

the RIOT¹⁰). On the other hand we might have a non-(ICT) technological experience – like performing music or a drama which is enhanced by the provision of technology to support discussion and interaction about the event such as the use of social software.

5.5 Augmenting the space or making a different place

Using technological overlays on space we can either add to the information about the real space or use the technological overlay to alter the space into another space. Enhancing what is there may include features like the outputs of projects like ARCHEOGUIDE¹¹ that aims to virtually reconstruct ancient monuments as they are or overlay information in museums and galleries like CONNECT¹². More simply, the BBC provides MP3 tours of places linked to television programmes.¹³ Alternatively you can create in spaces things that aren't there such as the Savannah project that turned a soccer pitch into a virtual Savannah full of wild animals¹⁴. It is also possible to undertake activity to augment space when you are in it as in Mudlarking¹⁵. Also within this context we can use technology to link one space with another – as phone calls always have. There have been exciting intergenerational multi-location performances of Carmen¹⁶

5.6 Synchronous or asynchronous interaction

For some experiences you just have to be there. They are events that require people to be in the same space (virtual or real) at the same time. Blast Theory are an art collective that specialise in designing experiences like *Uncle Roy all around you*¹⁷. This demands you are in particular locations at particular times. Another example as Flash Mobs: events triggered by a network of mobile phone calls that direct a group of individuals to a contrived event in a given location. However the technology may be persistent. The experience will be still in the augmentation of reality of the means of contributing and communicating about an experience is on-going. A typical technology is *Active Codes*, eg Hewlett-Packard 'Active Posters' or Siemens Sיעodes or Fujitsu steganograph. These are all marks on real objects in the environment (like barcodes) which can be decoded through the mobile phone camera. The code can then carry information like a website URL, a phone number or just some text that can trigger the phone into action. The messages remain in the environment and if the link is something that can be collaboratively edited then what you see will be the product of on-going collaboration.

10 http://www.bbc.co.uk/bristol/content/madeinbristol/2004/04/riot/riot_story.shtml

11 <http://www.cultivate-int.org/issue1/archeo/>

12 <http://www.connect-project.net/index.asp>

13 <http://www.bbc.co.uk/coast/archive.shtml#walks>

14 <http://www.futurelab.org.uk/showcase/savannah/index.htm>

15 <http://www.futurelab.org.uk/showcase/mudlarking/index.htm>

16 http://www.futurelab.org.uk/showcase/virtual_carmen/virtual_carmen.htm

17 http://www.blasttheory.co.uk/bt/work_uncleroy.html

5.7 Some Technological Questions

There are some technological questions that are best answered when we place technology in an appropriate socio-cultural setting such as intergenerational learning settings. They present real challenges to the utility and functioning of technology. Some of these questions are:

- How do you dynamically configure the technology of the location to fit the needs of the person in the location?
- How do you dynamically configure the technology a person brings to a location to the context of the location?
- How do you dynamically configure the system to the context of the person?
- How do you ensure security and integrity of both the system in the location and the security and integrity of the person's data?

A significant word in all of this is *salience*. In any given space, at any given time and for any set of people there is a mass of knowledge that might be appropriate. It might be the time of the next bus, it might be the political significance of the iconography in a church 20m away. Providing the right information at the right time is a socio-technological question and many of the issues are raised in the intergenerational learning context.

6 The Research questions to be answered

We address the future research agenda in two ways. We raise specific research questions which have been partly addressed by the La Piazza network and clearly need further attention. These cover the topics of intergenerational learning in general, technologically enhanced spaces in general and then issues that arise from the specifics of their combination. They also include questions about technology, design methodology, research and evaluation methodology and questions about the economics and business of informal learning.

Secondly, there are practical questions about research capacity and infrastructure.

6.1 Some Research Questions

- i. What are the social benefits of encouraging meaningful encounters and learning experiences between young people and adults? What are the main obstacles against these encounters?
- ii. How can we create environments that support these intergenerational encounters and learning experiences?
- iii. How can we create environments that support learning scenarios based on reciprocal relationships between young people and adults? What are the characteristics of these environments, and what cultural activities can promote social learning among young people and adults?
- iv. How can we mediate between the institutional, social and commercial agenda of different sorts of public spaces, with the social need to extend the opportunities to reinforce social cohesion (in this case, through informal learning strategies)?
- v. The digital is to be intended as an opportunity, not a “modern imperative” detrimental to the attention to be paid to the physical qualities of a space: how to articulate the digital and physical dimensions in the design of stimulating and sensorially rich spaces i.e. spaces that stimulate the use of several expression languages (gestures, sounds, visual, etc.)? How to mediate and enhance the perception and the experience of these contexts?
- vi. How to bypass the difficulties generated by “volatile audiences” (typical of museums), and create instead the conditions for the consolidation of authentic communities of practice, that can inscribe the learning and social opportunities into a longer term perspective?
- vii. How can we cater for the need to keep traces and memory, in order to increase the “identity” of the place and the

“identification” of youngsters and adults with it? (Preserving social memory and value people’s “tracks”)

- viii. What is the impact of a “Third” in the design of the learning scenarios (for instance, someone to whom the common output can be shown), to harness both adults and youngsters’ common endeavour? (the metaphor of theatre...)
- ix. How to cater for the different perceptions of time, rhythm and space of young people and adults, as well as the non-intergenerational subjective perceptions?
- x. What new kinds of intergenerational learning and cultural applications become possible through pervasive and locative media? Are there innovative installations, performances, games and other public experiences?
- xi. Are there common linguistic and methodological frameworks we use for addressing the opportunities that arise from the convergence of pervasive media and locative media, and shared, publicly accessible ICT resources? In what ways does specific attention to intergenerational learning change these frameworks?
- xii. Does intergenerational learning in public spaces provide opportunities for developing social solidarity? Do issues of the *digital divide* – either economic or generational – prevent exploitation of the new opportunities?
- xiii. Can we devise common design frameworks and tactics help create powerful user experiences? Can we identify and share design guidelines and generate useful abstractions? Specifically, can we devise design frameworks which involve intergenerational groups as part of the process?
- xiv. Can we build tools for designers that, for example, enable them to easily create or recreate an experience, and maybe get it to work in different locations? What new research challenges in human-technology interaction allow us to conceive of, visualise and implement new experiences in space with technologies like, for instance, sensor networks?
- xv. Can we devise new activities that uses the growth of social software, particularly social software on mobile technology that allows people to interact together to reconfigure their presence in space in new ways? What issues of intergenerational learning arise from the availability of mobile technology and the uptake of social software? Do these pressures increase the intergenerational divide?
- xvi. Can we develop sets of research methods to design and evaluate these experiences? We already see the use of ethnographic

studies, and audience discussions; how should these be extended and can we share approaches, tools and even datasets to enhance our understanding of experience and design?

- xvii. What business models are available for funding and sustaining intergenerational learning in technologically enhanced public space? What are the social implications of different models?

6.2 Research Infrastructure

Is there an appropriate research infrastructure for further research on intergenerational learning in technologically enhanced public spaces? Research in this domain is expensive because of the technological infrastructure and running costs. The spaces in which many of these activities occur are in museums and galleries – which are continually trying to attract funds for current core business let alone expensive technological innovation. Other strong cases for intergenerational learning arise from combating social and economic exclusion, and although considerable proportion of governmental funding goes towards combating social exclusion, technologically enhanced public spaces are not an obvious part of the agenda for officials in that domain.

Much of the technological research required - for instance in the domain of wireless sensor networks or in global positioning systems - is done to support military activity, industrial process and civil infrastructure management. The social, cultural and public applications of these technologies are often ignored. This is a mistake. Major new industries can be formed by the public interactions with this technology – however the financial entry point to exploit these technologies is beyond the scope of innovative SME's or public education institutions.

Many experimental interventions in this field are by their very nature one-off. They are seldom repeated, replicated elsewhere or move to whatever next phase. This is because of the nature of the funding, and, in museums and galleries the activity is often associated with a changing exhibition. This does not make for good research, validated and reliable results and transferability. It does not allow for continuity of development.

There could be the need for the equivalent to the cyclotron or MRI Scanner –major research sites – for technologically enhanced spaces and the learning which happens in them.

There is a case for setting up some specific research infrastructures in which can be maintained and serviced by appropriate technical support, can provide spaces for activity in technologically enhanced space, have spaces for reflection and have spaces for the researchers to interact with the participants. These would be of value to social scientists, cultural experience designers and the researchers in the technological infrastructure. Current Calls for the EU (as in the case of the development of GPS) do not support the establishment of such facilities. EU Calls could do much to encourage the establishment of the multi-disciplinary groups and provide the research sites that they need as laboratories.

7 Conclusions

La Piazza has been able to conduct a significant exploration of the issues in intergenerational learning in technologically enhanced public spaces. We have established that it is a domain worthy of further study. We demonstrate that it will be useful to continue research in social, cultural, psychological and hence economic benefits of intergenerational learning. We have demonstrated there are a range of technological developments that can be applied to the domain. More importantly we have demonstrated that there is an emergent framework that brings together all of these dimensions which can be further developed to deepen our understanding and lead to practical implementations of activity in this domain.

We have produced a list of potential research questions and we have suggested the need for both research and a research infrastructure. We are confident there are scientific, social and economic benefits for conducting further research.