The fusion of clever urban initiatives and digital applications

Teaching architects and urban designers how to make apps for the public involvement

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Smart cities demand digitally smart designers. Teaching architects and urban designers how to combine clever initiatives and tailored digital applications to their advantage when trying to involve members of the public is one of the important aspects of contemporary designer education. The paper demonstrates an example of such an effort, highlights the reasoning behind teaching and methods used, follows the learning path of students (and teachers) and analyses the process, illustrating it with student work, offering architectural, pedagogical and reflective implications for the purposes of similar introductions of topics in architectural and urban design curricula.

Keywords: digital applications, apps, urban initiatives, non-experts, public participation

INTRODUCTION: SMART CITIES DEMAND DIGITALLY SMART DESIGNERS
Architects and urban designers are (arguably) well skilled in the use of digital applications, especially those used for professional purposes. Even if not, mobile devices and digital applications permeate our social lives and exchanges to the extent that regardless of the profession, we are all living in the digital domain. But when it comes to the fusion of digital applications and public involvement, the majority of designers tend to follow social media trends and the use of the existing digital applications. The tools and services they provide are not always completely tailored to the designers' needs and are often lacking specific functions and visual upgrades that would help in expert - non-expert communication.

On top of the conformity, the students of architecture and urban design often perceive the field of digital applications and mobile devices to be outside their scope of skills and job descriptions. However, smart cities (Batty, 2013) will demand 'digitally smart' designers. With their insight into the field, into the needs and expert - non-expert communication, they are precisely that needed driving force behind the inspiration and development of fresh, tailored and specialized digital applications to be used in design processes when non-experts and lay-public are involved.

While we can interpret the urban users' needs
and wishes indirectly from the hints the users leave in space with their adaptations and interventions (Sanches and Frankel, 2011) or with the more traditional approaches, such as town hall meetings, workshops and questionnaires, we can reinforce the efforts with the use of specialized apps, with the added benefit of actively engaging the user into the dialogue, asking for the feedback and through his responses, actions and initiatives inviting him to become a co-creator of urban places.

The use of such applications is only meaningful when they provide unique added value to the design process as no other tool can, either by being widely accessible, mobile, real-time processing, automating a process, merging different tools, etc. They are not meant to replace existing social media or other existing applications but rather satisfy a specific need. There are several successful public participation platforms and application examples (Rucker and Whalen, 2012) and the best ones bring added value to the user - who can e.g. express his/her opinion, make a suggestion, reinvent or reorganize the space, etc. - or to the designer/researcher - who e.g. benefits from the crowd-sourced collection of data collected or suggested by the users, gets the user perspective, is able to communicate with the usually anonymous and elusive lay-public, etc.
MATERIALS AND METHODS

Course settings: know the box but think outside of it

To activate and support the development in the above mentioned direction, we have involved the topics of development of digital applications for fostering public participation and data collection into an elective, one semester course titled Space & Media. Based on our previous research into the public involvement in urban design and architecture, presentations for non-experts, collaboration with the general public (Mullins, M., Zupancic, T. and Juvancic, M.: 2002), and previous course experience, the initial settings, goals and outcomes were clearly defined:

1. The students first needed to define physical place of their interventions out-of-the-box thinking is only possible if you know what the box is and as we will later describe, the space itself greatly influences and inspires the proposed solutions / applications.

2. The involvement of public is a process with procedural, logistical and technical as well as design aspects: start with the definitions of the problems in space, propose a complex solution and the involvement of public on all levels, come up with fresh and innovative actions and only after that start finding out where and how a digital application would help support the process.

3. The digital application had to be clearly presented, all its functionalities implied and demonstrated to the extent that a digital designer or a programmer would be able to understand the ideas and this would represent the foundation for the potential software application development.

The course was introduced by showcasing different initiatives involving public participation (done by teachers and students) across different countries (the student attendance was international). The cases ranged from installations in public spaces that involved or animated the public (e.g. Dominoes at Mladi levi festival in 2011, see Note 1) to more elaborated initiatives (e.g. Beyond the Construction Site running for the third consecutive year, see Note 2) using all kinds of communication channels. The examples ranged from single events or short-term actions (week long) to long-term processes (couple of months, years). Teachers of the course also presented ways of conceptualizing and demonstrating digital applications and functionalities with the help of mock-ups, prototypes and animations (as described in Buxton, 2007). Following the above mentioned steps and the discussions on each level. Students also used illustrated on-site questionnaires to

Figure 2
The on-site (illustrated) questionnaires to gather the data and demands of the present users have been used, simulating some of the roles their apps would later take over, and to respond, adjust and steer their proposals.
Students used different ways of conceptualizing and demonstrating digital applications and functionalities with the help of digital and analogue mock-ups, prototypes and animations.

research users' opinions and needs and then set to design a public involvement design process, concept for the application (app) that would support this process and final urban design process proposal combining the lay public, the initiatives and the proposed apps.

**The crowdsourcing application as a showcase for app prototyping**

**My Favourite Places Drawn.** The crowd sourcing application prototype My Favourite Places Drawn (Fig. 1), developed within our research laboratory (Note 3) has been used as a demo showcase of how to formulate, conceptualize and prototype such an application, incorporating the initial idea, definition of goals and specific aims the app should fulfil, definition of targeted audience, benefits for the researchers/producers and users, intuitive design, definition of functionalities, developing the illustrations and a working mock-up prototype that can be used either in the discussions with the experts who will eventually develop the application for distribution or for the fine-tuning and evaluation purposes.

My Favourite Places Drawn is a prototype of a web-based application, which would enable the users to upload and present their favourite urban places in a sketch-like manner. In this sense it is also a tool for easily turning photographs into drawings that can be saved, exported, coloured or printed. The researches may use it to extract detailed and meaningful data from the photographs of the urban places and at the same time graphically equalize the visual material for comparison and research purposes.

**The functionalities.** The conversion starts with the import of the photograph (drag&drop), turning the photograph into line drawing (edge finding filter), adding the drawn elements from the libraries of people, urban furniture, greenery, transportation, etc. The elements can be stretched, flipped, put into foreground, background, deleted, locked, etc. It is also possible for the user to trace the edges of the background image 'by-hand' thus completely converting the uploaded photograph into the drawing.

It will be possible to vote for the best urban place or drawing and the list of most viewed, most liked and most commented drawings will be visible to other non-registered visitors. Users who will want to add their photographs and use the application will have to register (for free) and give consent to their creations being used for the research purposes.
“Pimp your city” and “Campaigniser” were the two initiatives proposed by the group of students and they each included sub-actions such as “graff customizer”, dealing with graffiti design, “lighting customizer”, “adopt a part of the city”, “animals back in town”, “fresh air factory”, “furniture customizer”, etc. The initiatives are extensively supported by the cross-platform digital apps facilitating competitions, voting for favourites, scheduling, proposal, on-line merchandise shopping, donations, etc. The initiatives are also dealt with the graphic design. (students: M. Bourget-Mauger, A. Chifflet)

Benefits for the user. The user is able to present his favourite urban place to a wider audience and what is more appealing even convert it to a drawing. Further uses can also be envisioned: the photographs quickly become a colouring book, the drawings are usually clearer and have less clutter for further work on them. They can be changed and modified. The urban scene can be recreated, modified or reinvented, etc. By selecting different themes and having the known elements already in place in the drawing, the user can have fun with completely changing the character of the drawing (e.g. child-like drawing, robot city, etc.)

Benefits for the researchers. The researchers benefit from the crowd-sourced collection of urban places created by the users. The tool offers a way of extracting detailed and meaningful data from the photographs of the urban places and at the same time also graphically equalizing the visual material for comparison and research purposes (e.g. eliminating the photographers’ skills, use of effects, lighting and image quality from the equation). By placing the elements with certain attributes and characteristics into the drawing, the urban places will not only get recreated in a uniform and comparable visual manner but will also be digitized in a way to enable the application of statistical and qualitative analysis. Cause and effect relationships in urban places can thus be researched, tested and surveyed; walkability, pleasantness and similar indexes established and fine-tuned; a wide range of micro-urban environments can be compared and dissected.

RESULTS
The process yielded two proposals from two groups of students, both dealing with different places (in character, centrality and users) in the city of Ljubljana. One has the square-like characteristics, it represents the crossroad of different paths, users and traffic modalities, and the other is a less defined place without the distinctive shape, primarily used for transition. Each of them has its own set of advantages and hindrances that students tried to identify and address with their proposals. The spaces were chosen to keep the task tangible and less hypothetical, to force designers to think about actual problems and respond to them accordingly and to rethink the proposed applications in the terms of their specifics but also their generic nature - applications which could be used in similar cases or even cover broader spectre of city places. Both groups used the on-site analogue questionnaires to gather the data and demands of the present users, in a sense simulating some of the roles their apps would later take over, and to respond, adjust and steer their proposals (Fig. 2) towards the
feedback they have received. The instructions for the presentation of their concepts have been less defined.

They were told to use any means presented initially that would demonstrate their app concept and its functionalities (Fig. 3). The visualizations and graphics of the proposals can be best described as draft sketches and are not compatible with the rich visual language of the interfaces we use in our daily life. They were used solely to clearly and effectively present the idea to the teachers and IT experts. For their final presentations both groups used Pretzi (Note 4), which itself allows for more dynamic, visual and interactive presentation.

**Pimp your City and City Campaigniser**

The first group, dealing with the square-like place, has upon analysis established that while the place being particular it also has characteristics of similar town squares across European old parts of cities. Their proposal for the public participative design process and supporting apps is appropriately generic in nature and can be utilised in many similar situations whether in the same or other cities. While in need of some minor urban design changes, which the proposal does not address, it rather focuses on the initiatives and apps that would mobilize change in the appropriate direction.

"Pimp your city" (Note 5) and "City Campaigniser" (Fig. 4) are two sets of loosely connected initiatives proposed by the same group of students and they each includes sub-actions. Each of such actions involves the members of the public and is extensively supported by the cross-platform digital apps, which usually have a three part structure: a competition for the best proposal coming from the users or a voting by the users choosing the best design proposed by experts, a gallery of successful cases or an e-shop with the merchandise and an event schedule that informs about the happenings connected to this initiative (Fig. 5).

"Pimp your city" deals with the physical change of urban spaces through the redesign of urban furniture ("furniture customizer"), urban surfaces ("graff customizer", dealing with graffiti design) and urban ambients ("lighting customizer"), which are directly influenced/co-designed by the members of the public. "City Campaigniser" fosters direct involvement of the urban users by making them adopt a physical part of the place or otherwise tying a person to a particular object, thus creating a stronger bond between the place and the user, while also raising the awareness of environmental, societal or cultural issues. The initiatives include the adaptation of a part of the city for gardening or other activities ("adopt a part of the city"), sponsoring the implementation of greenery in cityscapes ("fresh air factory"), reminding users of other cultural or natural heritage and values ("animals back in town"), etc.

*Figure 5*

Each of sub-actions involves the members of the public and is extensively supported by the cross-platform digital apps, which usually have a three part structure. The process is in the forefront, the form and the materiality as well as the graphic design of the app follow in its footsteps.
**Urban CO.design.ER**

The second group took a transitional, less articulated and loosely defined space with undefined identity as their starting point of thinking about possible procedural, event and app supported initiatives that would help improve the experience for the public user. The complexity of the situation has resulted in a complex procedural public participation process proposal, where the co-design and co-decision-making stand in the limelight (Fig. 6). The name - "urban.CO.designer.ER" - suggests the cooperative nature and the emergency intervention that the place is in need of. The process would aim to take into account all the age categories of the space users, giving them the possibility to express their ideas about the place. According to the age groups, the means of communication would range from traditional media and 'messengers' (e.g. letters per post) to the new means of communication like game based apps (e.g. for children and youth), specialized mobile apps, desktop applications and social networks. The experts would then group and combine ideas into several design/action proposals and the users would be again asked to vote for their favourite. The process allows for the members of the public to both co-design or at least influence the design and participate in the decisions.

The students then focused on one particular app (running on mobile devices, desktops and on-site interactive kiosks) that would enable the users to suggest ideas (through intuitive, touch screen based interface), choose among pre-determined changes (e.g. change of colour) and observe them in real-time presentations, pick urban furniture, propose events, and share all this with all other interested members of the public and with designers (Fig. 7).

For the rough prototype they have used a mock-up paper model, where the user 'clicks' were simulated by changing the hand drawn elements of the user interface and through which the functionalities of the proposed app could be initially tested.

Not being able to go through the motions of their proposed co-design and co-decision making process and fully involving the public into their project, they nonetheless came up with the intervention such an app could yield. The proposal involves a mobile food stall and moving urban furniture, plant pots and lights, which can be rearranged per public taste and frequently changed by the users. While the food stall brings the additional and much needed programme to the place, the moving parts introduce the dynamic nature and liveliness to the sub passage. Their proposal not only ensures the involvement of the public during the planning but also encourages it during the implementation and use.

**DISCUSSION**

The course has been teaching - and not research-oriented. The following findings are not based on the precise and laboratory like data collection and have not been quantitatively tested, but can be useful when similar topics and teaching are introduced.

**Particularities of a given space inspire - and are reflected in - the apps concepts**

The place of reference has proven to help in the process of conceptualizing the digital applications. The problematics in the space has contextualized and brought perspective as well as specialization direction of apps needed. The two spaces chosen by the students were diametrically opposite, both with certain problems - one particular, mono-functional, with clearly defined needs and the other, more complex, articulated and multi-functional, with less discernible needs and obvious solutions, which are very much reflected in the proposed initiatives and apps. While the mono-functional space gets a tailored app and urban design response to stir up the space-use in new directions, the more articulate but complex space benefits from more generic but nonetheless fresh fusions of initiatives and app variations.

The choice determined the approach and further development of concepts which led to specialized solutions and apps on one hand and to more generic, more widely applicable proposals for different cities and neighbourhoods on the other.
Digital app concepts arise to genuine needs and they alone are able to fill the void
Both proposals used the apps to address and introduce much needed but specific functionalities that cannot be served otherwise. While one is used to gather broad perspective of existing and future users' suggestions for the space development and redesign, the other supports several initiatives to enliven and define the given space and other spaces in the city. Both are designed to work across several

Figure 6
The complexity of the situation has resulted in a complex procedural public participation process proposal, where the public co-design and co-decision-making stand in the limelight.
Figure 7: “urban.CO.designer.ER” is designed to involve the public in “ER” interventions in Fabijanjev bridge surroundings. The goal is to improve the grey and boring area around the factory and the bridge with the help of users’ and passers'-by suggestions, where digital app comes handy for data collection and co-decision making in order to make it into a lively and joyful space. (students: I. Krznarić, M. Mikócziová, K. Ignaciuk)

Platforms and on different devices, including mobiles. They encourage widespread non-expert participation, foster voting for proposals, scheduling of events and mobilize the once anonymous user - all on the levels previously impossible through traditional means (or possible but resulting in costly actions).

The initiatives provide the drive, the apps facilitate them
It is the fresh and new ideas about the initiatives that promise change in the given places. The process is in the forefront, the form and the materiality as well as the graphic design of the app follow in its footsteps. The initiatives, the place and the intuitive and easy-to-use app that facilitates public involvement, feedback, multidirectional communication between experts and users, decision making, act as a system and create added value (in some cases they could not come into existence without one of them). They reinforce and support each other, while each as a stand-alone could not produce the same synergetic effect.

Insight into the field of digital apps - not a change of a profession
While it is usually neither possible nor viable to teach the students of architecture and urban designers the higher level skills of programming, needed for the realization of a finished digital product - the making of the application has not been the aim of the course - it is still important and possible to equip them with the rudimentary lingo, methods and knowledge, for collaboration among different experts in the field and make the software development seem less intimidating and out of reach. At the same time the designers can bring a fresh perspective, both in a sense of needs for-, use of- and new ideas into the sometimes rigid IT world of apps and interfaces.

CONCLUSION: FUSION ACHIEVED ON SEVERAL LEVELS
The education of an architect or an urban designer has to reflect the current trends in media and digital application use by involving these topics into the existing curricula and developing particular skills. Only in this manner will the future designers be able to take an active part in the design of smart cities and apps, which will bring the public involvement to new levels.

In line with the conference theme, the paper traces several fusions that rise above mere amalgamation: a) fusion of skills - skills of an architect but also of digital app designer, b) fusion of digital tools and fresh initiatives - the fresh initiatives provide the drive, the apps with tools facilitate them, c) fusion of expert and non-expert participation and collaboration - always elusive mix and balance are given more
credibility and do-ability through the use of digital apps.

While the mainstream currents always produce much needed critical reflections (Note 6), the e-world is a given fact facing the urban designers and architects of tomorrow which should be reflected in the curricular development in architectural and urban design education.

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ENDNOTES
1. The dominoes in the form of breeze building blocks were set all over the city of Ljubljana leading to the venue of the festival, triggered and when the last one fell the festival started. [1]

2. Beyond a Construction Site is a community-based garden intervention on an empty and long abandoned construction site in the centre of Ljubljana. Neighbouring residents and other interested can tend for the urban gardens and socialize. [2]

3. My Favourite Places Drawn app prototype has been developed by M. Juvancic and S. Verovsek and is stemming from their research of visual urban vocabularies. [3]

4. Prezi® by Prezi Inc. is a cloud-based presentation software and storytelling tool for presenting ideas on a virtual canvas that can run also in an offline mode.

5. The apps have been named by the students as branding was seen as an important part of the process and it denotes (or should at least reflect) the app’s intended function. Not all the names for apps are completely relevant or spelled correctly but nevertheless give them their own identity.

6. Adam Greenfield’s book 'Against the smart city: the city is here for you to use' is such an example, which points to where the current vision of smart cities could lead us with dire and unwanted consequences (Greenfield, 2013). It is also a reminder that we should not overcomplicate the use of urban environments and not to over e-design them.

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