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Learning urban morphology from emergencies

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Resilient planning tools for sociality

Architecture, specifically open space design, can be a healing tool in trauma recovery after a disaster. Open space is the connective tissue of urban systems, bearer of identity and collective life. It compensates for personal difficulties by promoting community strength. Thanks to its better transformation's capacity than the built environment's one, open space design strategies can become resilient tools for sociality. The study of fragile post-emergency settlements, including temporary ones, provides new inputs to create time-sensitive resilient urban answers to foster social liveliness in every situation. In emergency scenarios, the functionalist approach prevails. Emergency regulatory freedom is an opportunity for unprecedented spatial configurations oriented to sociality: there is a need for social approach and focus on open spaces. This shift's results can be then further developed in the wider urban morphology research field. To design in a social perspective necessitates theoretical and empirical interdisciplinary research. Proxemics, Urban Sociology, Sustainability Psychology and Environmental Psychology give significant contributions. Participatory processes identify socially relevant features in the present and past urban forms. Urban planners can translate these into design inputs for future outcomes. Time-consciousness in place-making in these scenarios trains architects and planners to identify tools in a more precise and fast way, creating fair and efficient methods to be replicated in other urban forms, especially in socially complex contexts. The result is intended as a design able to create opportunities for appropriation and alteration of space (affordance concept) and to be bettered, ensuring inclusion and accessibility over time, as in a post-emergency evolution. Strategies from post-emergencies can also prevent damage to social systems. Simple and tested tools are the new vocabulary: user-friendly guidelines provided to next-generation policymakers, architects, and citizens. The wider scientific community can use the method of analysis, selection, and interpretation of space to enhance sociality in any urban form.

Keyword: *emergency, urban sociology, open space, community, design parameters.*

Community-focussed urban answers for traumatic experiences

Natural or man-made emergencies clearly connect social and psychological difficulties to architecture: the loss of the built environment follows that of the identity of the place, which made up the social geography (Calandra et al., 2016) of the inhabitants. Architecture, specifically open space design, can be a healing tool in trauma recovery after a disaster. Open space is the connective tissue of urban systems, bearer of identity and collective life. It compensates for personal difficulties by promoting community strength. Thanks to its better transformation's capacity than the built environment's one, open space design strategies can become resilient tools for sociality. The study of fragile post-emergency settlements, including temporary ones, provides new inputs to create time-sensitive resilient urban answers to foster social liveliness in every situation.

The Master Thesis “Social reconstruction in post-seismic emergency” investigated the role of Architecture in the post-earthquake scenario in the Italian “inner areas” (“aree interne”) and it is the base for a further development currently carried out through a PhD program at the Architecture Department of the University of Florence (2020-2023). The importance of this topic can be summarized in the fact that by underestimating the social rehabilitation after a disaster there is a risk of rebuild places for communities that do not exist anymore due to the individual fragility of their members. These events shatter mental health assumptions formed in the context of community life; since trauma leads to social de-bounding, trauma recovery involves community reconstruction (Gordon, 2004). Projects, even temporary ones, are considered necessary to foster social unity and community resilience (Mela, 2017) and the post-emergency phase appeared to be the most delicate time as it sits between the loss of social geography and the creation of a new one. Community recovery, «the material and immaterial reconstitution of the community» (Mela, 2017) starts here. Thus, this research developed design tools for open spaces in post-disaster settlements to facilitate social interactions to support trauma healing.

Research context and development

As confirmed by studies on post-disaster phases, people affected by catastrophic events go through feelings of fear, uncertainty, dis-empowerment and isolation which lead to community unbundling and a change in their identity process. The vision of identity as a process assumed by the Master Thesis research derives from the interview with psychologists of the case study, a small village in Central Italy called Accumoli (Fig. 1), destroyed by the 2016 earthquake and replaced by a temporary one (Fig. 2). The temporary settlements are generally dispersive urban systems, feature that can have long-term negative effects such as isolation, inertia, and social disruption. Whatever the temporary housing structures, their relationality must be well designed to promote social interaction in public spaces, to foster the post-disaster social reconstruction and to continue the identity process of the place and its inhabitants.



Figure 1. Accumoli case study, before the 2016 earthquake.



Figure 2. Temporary village of Accumoli case study under construction, 2017.

A structured set of design tools based on the research was proposed including the selection of elements from the past, the analysis of the environmental and social context and good practice to strengthen the community cohesion. The interpretation of the past is summarized in the analysis of functions, users, and types of public spaces before the earthquake. This is essential because the perception of post-earthquake is strongly influenced by that of the previous condition since the perception of the former is influenced by that of the latter (Fenoglio, 2003).

The goal was to promote a design able to create opportunities for appropriation and alteration of space according to the affordance concept (Gibson, 1979) and to be bettered over time, ensuring inclusion and accessibility according to the post-emergency evolution. Strategies from post-emergencies can also prevent damage to social systems. Simple and tested tools are the new vocabulary: user-friendly guidelines provided to next-generation policymakers, architects, and citizens. The wider scientific community can use the method of analysis, selection, and interpretation of space to enhance sociality in any urban form. The main development of this research project will be to translate the collected qualitative information into quantitative data, such as spatial parameters to be used in widespread BIM planning software. This planning tool would ensure social interaction between the residents of post-emergency settlements based on empirical research and literature, especially urban sociology.

Functional and social approach



Figure 3. Japan, Temporary Housing of Rikuzentakata, 2011.



Figure 4. Kenya, Kakuma Refugee camp, Market area and main street, 2019.

In emergency scenarios, the functional design approach prevails; there is a need to adopt a social perspective and focus on open spaces. The results from this shift can be then further developed in the wider urban morphology research field. To design in a social perspective necessitates theoretical and empirical interdisciplinary research; Proxemics, Urban Sociology, Sustainability Psychology and Environmental Psychology can give significant contributions.

The design of emergency settlements has mainly focused on housing structures, not on the relationship between them, ignoring the constant element: the open space, connective tissue of urban systems, bearer of place identity, collective life, and spontaneity of social interaction (Lauria et al., 2017: 56). The quality of living in open spaces can ease individual struggle, worsened by the nature of emergency accommodation

itself. In the examined cases, the spaces between the buildings are dull and dispersive, lacking identity to the point that the public realm provided is not able to attract the inhabitants outdoor; although it is recognized as it is here that community life takes place (Gehl, 1971).

In Italy, there is a lack of specific regulation regarding post-emergency settlements design. In addition, the Municipal Emergency Plans (*Piani d'Emergenza Comunali*) are focused on the first emergency, and they are often only sketched or even absent. The greater regulatory freedom in the emergency can often be an opportunity for unprecedented spatial configurations oriented to sociality. The relative temporary nature and the long-term effects of the post-emergency scenario on social systems, land use and the future of the environment make a guide to urban policy imperative.

These findings are also based on a comparison between the settlements built after 20 different disasters, starting from old to recent Italian earthquakes to worldwide traumatic events such as wars, flooding, persecutions. Very few recent projects aim to stimulate the sense of community: the functionalist approach prevails when it would be necessary to design with a social perspective for temporary. Thinking about design from a social perspective includes the possibility of different levels of congruences between the theoretical world of the designer and the real world of users' lives (Chiesi, 2010).

For example, in 2011, an earthquake struck Japan offshore, triggering a tsunami which caused the worst nuclear crisis in decades. Nearly 400,000 buildings as far as 3 km inland were damaged or destroyed. Dead and missing people are about 22,900 and 470,000 people were forced to find temporary homes. In Japan, The Rikuzentakata Temporary Housing project (Fig. 3) by Sugawaradaisuke Architects comes from the collaboration with locals. Architects found rich material and social resources locally. Instead of inserting "fullpackage supports" from outside, the attitude was to "link" local resources and preserve the natural landscape. Housing units were arranged to maximize space still providing gardens. Each house visual axis is specifically oriented to enable views from interior, creating possibilities for resident to interact with others through windows and external green space, while appropriately protecting private spaces. Even if this complex is recently built, it has an ever-lasting village-like atmosphere. The project lacks "magnificence" on purpose.

In a completely different context, African LGBT+ refugees settled in Kakuma refugee camp (Fig. 4) in Kenya since 1992. Kakuma camp and Kalobeyei Integrated Settlement is one of the 7 largest refugee camps in the world. What is relevant of this example for this research is that here inhabitants are redefining what it means to be a refugee, a temporary inhabitant of a place. In 26 years of existence, Kakuma has transitioned from a place of temporary asylum to an urban centre, complete with its own market with over 1,200 refugee-run businesses. The environment in the camp has allowed refugees to rebuild their lives and search for solutions to become more self-reliant. This does not mean that refugees here are no longer in need of humanitarian aid. Rather, it represents Kakuma's environment which provides opportunities for refugees to make the most

out of their resources. M. H. Mohamud, a Somalian refugee living in the camp, adds: «In the last couple of years, there has been a shift in the mindset of refugees in Kakuma. We have gone from seeing ourselves as hopeless victims who rely on food aid and NGO assistance to viewing the camp as ours and becoming active and productive members of society» (OFID, 31st October 2018).

Interviews by residents of the case study, comparison with other projects, and the literature review showed a widespread functional top-down approach; instead, community involvement is essential (Fig. 5). Participatory processes identify socially relevant features in the present and past urban forms. Urban planners can translate these into design inputs for future outcomes. Time-consciousness in place-making in these scenarios trains architects and planners to identify tools in a more precise and fast way, creating fast and efficient methods to be replicated in other urban forms, especially in socially complex contexts.



Figure 5. Accumoli community room, Meeting of the residents' committees, July 6th, 2019.

Methodology

Previous research show that the fracturing of housing tissue weakens proximity networks and, consequently, sociality (Calandra et al., 2016). The evaluation of the influence of new urban configurations on everyday practices can be carried out through empirical analysis of the open spaces of places that have suffered a disaster and, in preventive form, in territories at risk but not affected.

In post-disaster cases, both the open spaces of the new settlement and those of the original one are analysed (Fig. 6 - 7). The qualitative analysis of the new centres foresees observations according to Evidence Based Design (Chiesi, 2010) and interviews. Then, it is possible to move on to quantitative analysis (Silverman, 2013) of the sample with the distribution of questionnaires (Tusini, 2006) to collect information on the well-being of residents.

The study of previous open spaces provides possible inputs for the design of new ones. As for the case of Accumoli, the study should be done with empathy towards post-emergency scenarios, where time and resources require a few simple points of reference. The selected elements must relate mainly to the functions, distances, activities, and the consequent peculiarities of the spaces needed to carry these out. Historical and photographic documentation, descriptions of residents and studies of urban sociology helped this selection process of the backdrop of former social life. The participation of residents was fundamental: the characteristics of open spaces and the life that used to fill them are preserved in their memory and mind maps (Lynch, 1960). Processes of involvement, such as participatory photographic collection and cultural mapping (Chiesi, Costa, 2016) are also suitable for this purpose to create a synthetic and structured map of socially relevant spaces to be restored. Finally, a participatory site visit (Evans, Jones, 2011) is a good tool for both devastated places and those only at risk. In the case study, two residents volunteered to visit and describe the destroyed village.

The research fosters international collaboration and refers to the Mediterranean area where living the open spaces is a common cultural element, stimulated by the climate. A work experience in the UK (2018-2020) strongly influenced the research approach and methodologies. Here the focus on social aspects has been central, from inclusiveness to the conduct of participatory processes.

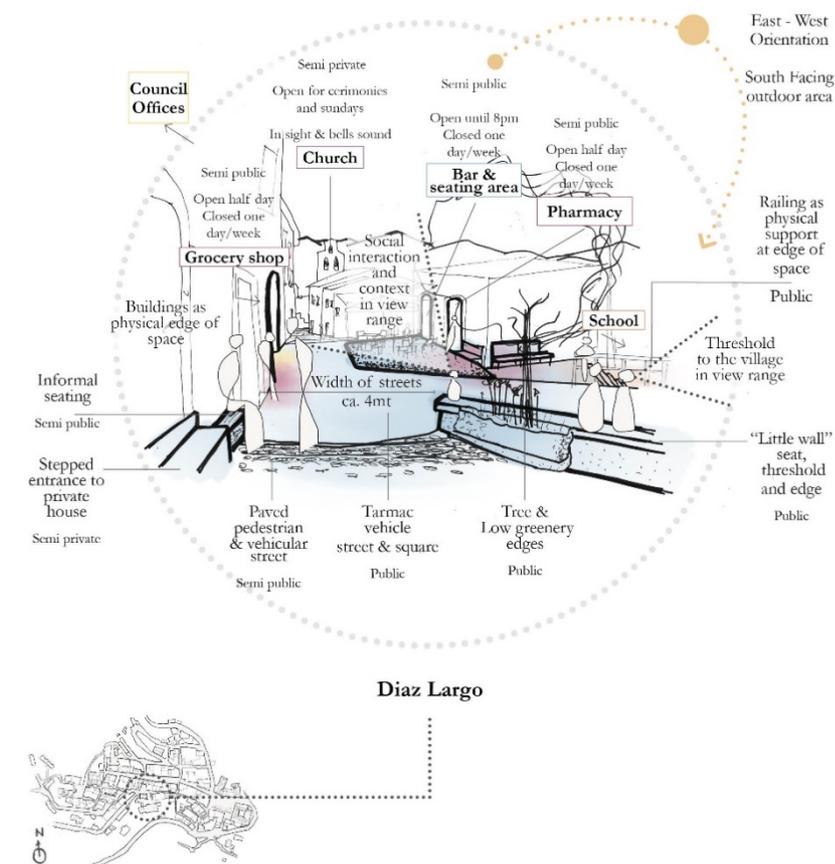


Figure 6. Accumoli, Diaz Largo, quick analysis of socially relevant features of the lost space.

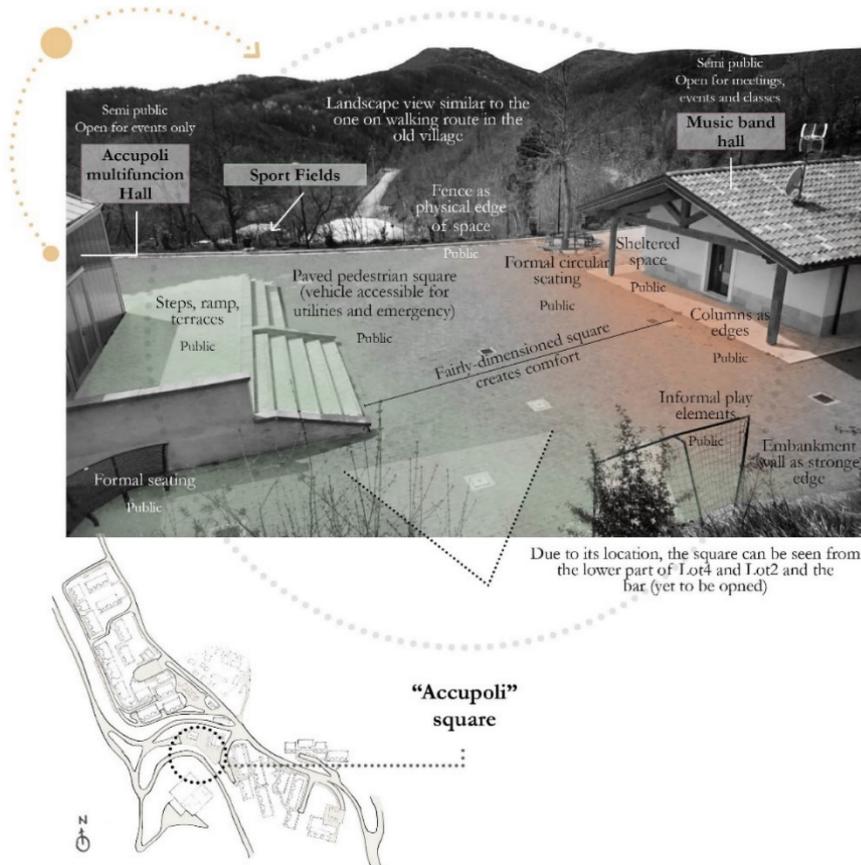


Figure 7. Accumoli temporary village, Accupoli square, quick analysis of socially relevant features of the new space.

Results and discussions

This research-action path proposed guidelines for open spaces design as a resilient method for overcoming post-emergency trauma (Fig. 8 - 9). After reflecting on the definition of "guidelines" (Rossi Prodi et al., 2013), the type of proposed tools is that of "best practice". They are not rigid rules, but easy to contextualize; at the same time, at best standardized and simplified for critical situations. The guidelines are dimensioned on small/medium-sized case studies. For larger centres, the tools can be used after a clustering process (Alexander, 1977). At this point, the settlements will be dimensionally suitable and will promote human-scale planning, as it happens for city districts. There are recommendations on layout, function mix and orientation of the buildings of a provisional village, considerations on appropriate interaction and walking distances, visual connections, boundaries between public and private and vehicular access. In the end, the outlined strategies are applied to the case study.

The project is intended as a process and not as a "turnkey" solution, capable of creating opportunities for appropriation and alteration of space. This way, the project can be a device to promote empowerment (Chiesi, Costa, 2016) and the identity process, which does not end with the post-emergency settlement construction. The created social space systems can guarantee various activities; they respond not only to

immediate needs but, by being implementable, they ensure inclusion and accessibility over time (Scottish Government, 1999).

From the research, it was evident the focus should be on the layout of the new urban development, the spatial relationship between the houses and the public space between them. The post-emergency modules would never fulfil the needs that the lost ones used to. A high-quality public space could instead satisfy these and new necessities, promoting at the same time social engagement.

The research is characterized by the ability to combine interdisciplinary methodologies and research tools to the themes of the project, in socially complex contexts. The work represents an original contribution with interpretative reflections and innovative and refined design projections for formal contents and languages oriented to a responsible project on the theme of post-emergency living.

Among the most evident results of this research, there is the awareness of the lack of attention to social aspects in the design of temporary settlements, while new design approaches with a social perspective can instead be positively developed. This unprecedented approach, not only in Italy, foresees the trauma recovery through the open space: a constant element regardless of the housing systems adopted. This kind of design can facilitate overcoming the trauma caused by a natural disaster, documented here by theoretical and empirical research.

The scientific community could use the method of analysis, selection, and interpretation of the elements of the social value of the settlements to deal with the reconfiguration of urban public spaces in emergency circumstances even other than the earthquake, such as the recent pandemic events. Students, teachers, and researchers dealing with social sustainability, post-traumatic scenarios, interpretation of existing and lost heritage, urban sociology and methods of qualitative analysis applied to Architecture are foreseen to be interested in the proposed research tools.

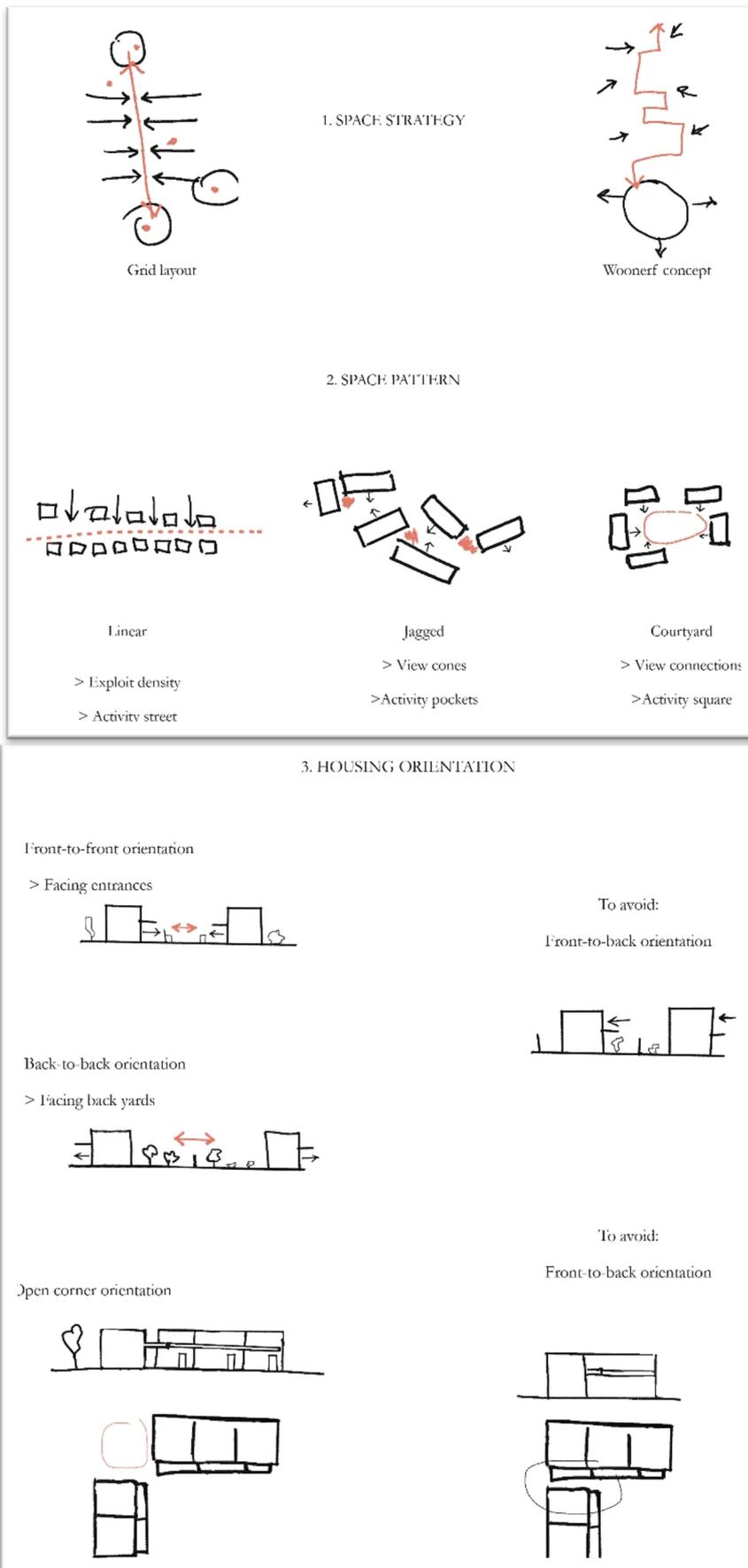


Figure 8. Space strategy, space pattern and housing orientation to be combined for socially engaging layouts.

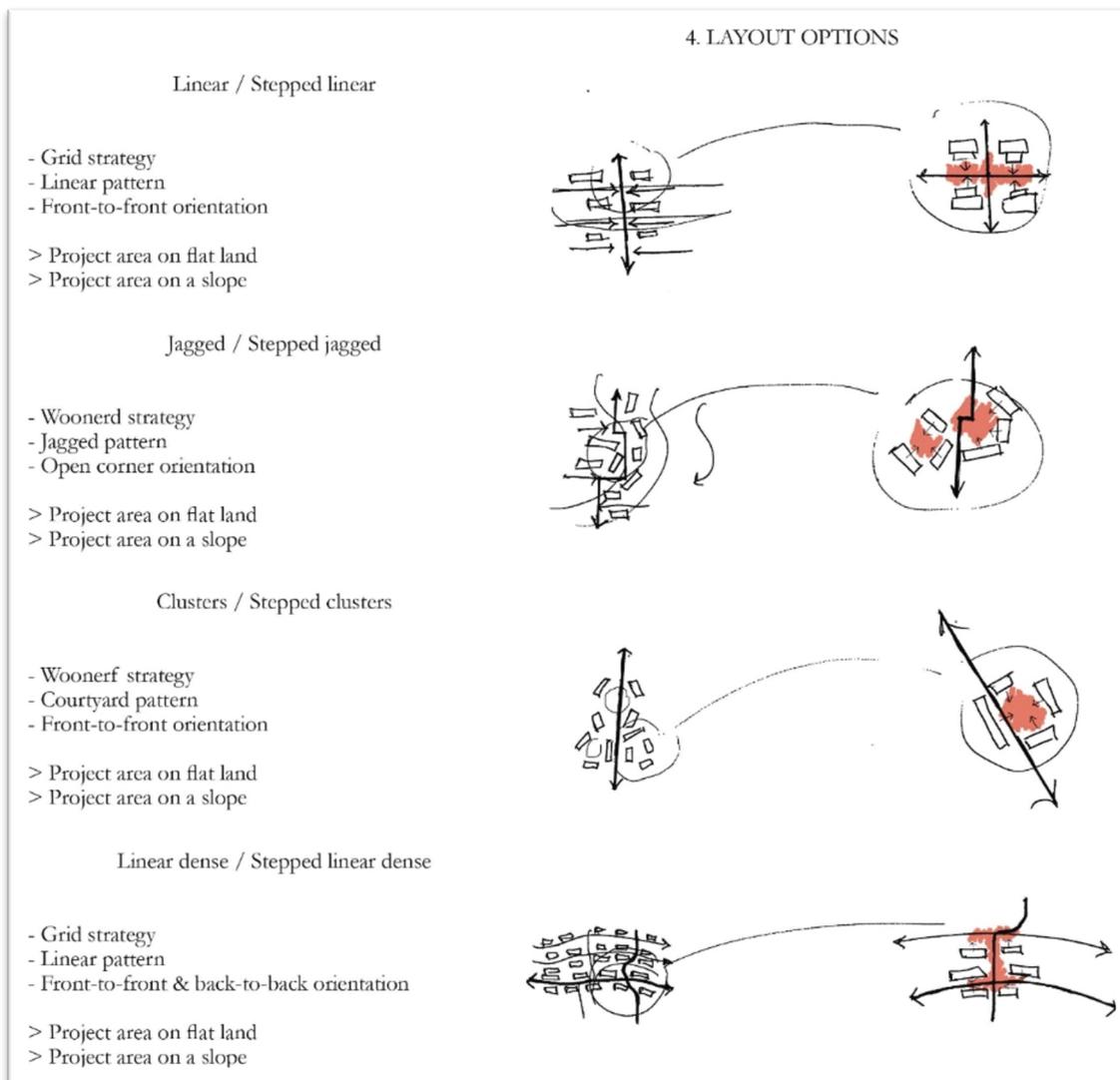


Figure 9. Layout options to create attractive community spaces.

Future developments

The recent Covid-19 emergency showed the importance of living the "outside" and of the spontaneous social interaction that people lost. Going back to interact in the open spaces is therapeutic to overcome the shock caused by the pandemic and it helps the return to "normality". Also, «thanks to its greater capacity for transformation than the built environment, the open space allows the urban context to be resilient» (Lauria et al., 2017: 40). In post-disaster living, unfortunately, this interpretation is abandoned due to the functional vision of the emergency. The result is «ugly spaces, in essence, because it is taken for granted that's how they must be» (Lambertini, 2013: 13). Here, on the other hand, an unprecedented interpretation of open spaces as a healing tool for trauma is proposed. Open space design strategies can be resilient tools for sociality in fragile contexts. The study of post-emergency settlements, such as the ones after an earthquake, provides new inputs to create time-sensitive resilient urban answers to foster social liveliness in every situation: simple and tested guidelines from post-emergencies can prevent damage to any social systems.

The proposed guidelines could be mentioned in the Municipal Emergency Plans (Piani d'Emergenza Comunali) or in the Implementation Urban Plans (Piani Urbanistici Attuativi), thus integrating elements related to the post-emergency. Strategies could be then implemented to prevent damage to the social system. In addition, the scientific community could use the method of analysis, selection, and interpretation of the elements of the "before" for other applications. The Italian Ministerial Decree 1444/68 interprets the open space as a necessary service to urbanization, but at an operational level, it is a just bureaucratic data (Lauria et al., 2017: 39). Its multiple roles in urban life are not valued, including the unprecedented role of cure of the traumatic experience. The space justice theory (Philippopoulos, 2015) supports the need for inclusion in the regulatory framework. This theory of social justice states that the relationship between space and law has a direct influence on sociality.

The participative processes gathered qualitative information on the design characteristics to foster social liveliness. The future development will be to translate the collected information into quantitative data to be used in widespread BIM planning software. Software by well-known companies, such as Revit Generative Design and OpenBuildings Designer, allow any user to layout elements or buildings according to different parameters. By next year, this research foresees to find the spatial parameters that would ensure social interaction between the residents of post-emergency settlements based on empirical research and literature, especially urban sociology. The complete development of the proposal is currently being carried out through a PhD project at the Architecture Department of the University of Florence that will end by 2023. The parameters could be used also in other planning processes, especially for small urban spaces which have shown their value and transformation capacity during the current pandemic.

Final considerations

This work aims to support authorities that need simple and tested tools in response to the emergency. These user-friendly guidelines can be used by administrations and designers and understood by the citizens themselves; thus, all stakeholders are equal actors in the dialogue for a participatory design (Berni, 2015).

The theme of this research revolves around the role of architecture in people's lives after a natural disaster. Architecture can have an active role in trauma recovery after a disaster: if the new built environment promotes social interaction between the members of the community, it could be a healing tool or, on the other hand, it could prevent inclusion and foster isolation.

It was fundamental to define the phase in which architecture can be an efficient tool for trauma recovery. Theory studies on shock handling and the experiences of psychologists who supported the population of the case study showed that life in temporary housing is the best opportunity for the community to heal before reconstruction. Most of their layouts are based on mere functionality. The design choices will have long-term repercussions on the inhabitants physical and psychological well-being. It could be less worthwhile to spend

material and economic resources to reconstruct villages or cities for people that are adverse to each other and are not able to share their common condition due to their individual fragility which could lead them to even abandon the territory.

As in this research, social sustainability is more often considered on a par with or even preparatory to environmental and economic sustainability. To achieve this, Europe provides co-design and co-implementation in urban development and daily policy to ensure the well-being of citizens. In the 2030 Agenda for Sustainable Development programme the mentioned theme is central: disasters caused by climate change, unstable political or social conditions and natural or anthropic disasters, and the associated risks and resilience.

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APPENDIX

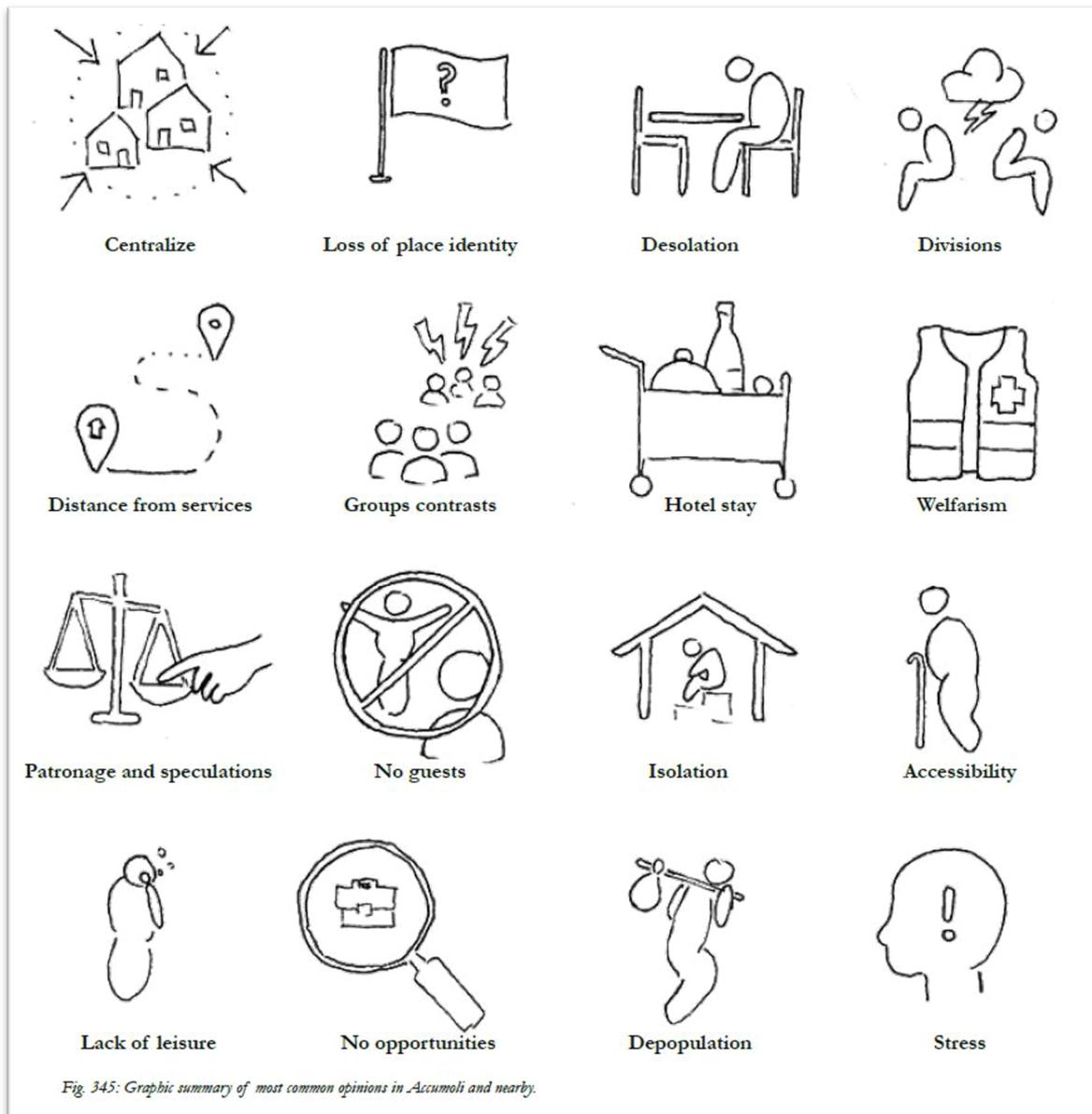


Figure 10. Main problems highlighted during the in-dept interviews.



Figure 11. Interviews' world clouds.

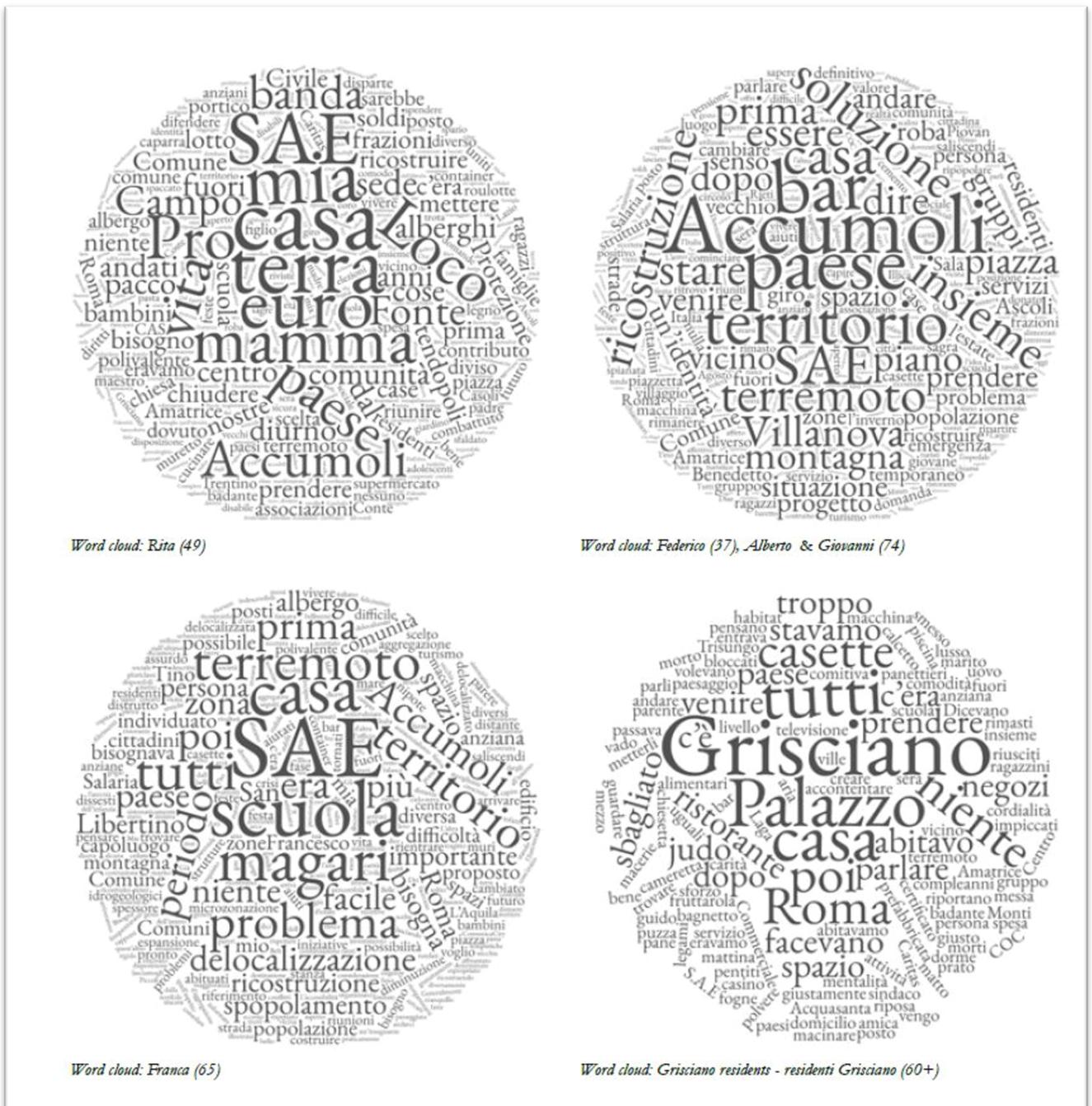


Figure 12. Interviews' world clouds.