

Creativity affordances of University Campus Open Spaces

The relationship between creative behavior and urban features,
Case Study Bauhaus University Weimar

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Abstract

Over the past decades, society has shifted the development process from the service economy to the knowledge economy, with knowledge generation becoming a key asset for keeping competitiveness. From these process implications, such a scenario also meant significant changes in the expectations towards educational spaces and how they can impact society and urban development. Furthermore, the university campus evolved from essentially training facilities into the core of the knowledge economy through strategic spatial development such as science parks and innovation and creative hubs.

According to previous research, campuses have their unique role on such socioeconomic structure by fostering knowledge creation and creativity, with current scientific investigations correlating the spatial features and their relation to knowledge sharing and other creativity-related behaviors, also referring to such spatial context as knowledgescapes. However, it is still possible to contribute to the existing knowledge by deepening the investigation towards whether there are patterns of how interactions and behaviors related to creativity occur specifically within the open spaces of educational campuses. This is by looking at which and how the physical features of campus open spaces impact the user's creativity. Also, doing so from the perspective of existing approaches that relate physical space as an affordance for human behavior.

This thesis presents an investigation of a specific scenario, which later might relate to similar contexts, being the examination of students' creative experience at the inner-city

campus of Bauhaus University Weimar.

The study follows a structure based on existing research. First observing the literature definitions on space and creativity, and since the latter is a reportedly subjective concept, it is derived hypotheses on its relation to traceable behaviors (frequent and diverse encounters, informal collaboration and relaxation/contemplation). Later on, from the understanding of such definitions, perform the analysis on the student's experience (questionnaire) in their qualitative and quantitative aspects. Afterwards comparing such findings to urban analysis on the accessibility, land-use and amenities such as seating and greenery. The comparison verifies trends and correlations between student's preference and the physical space. Lastly, an observational study through ethnographic study assists in understanding how the experiences described by users take place in specific places at the user level.

The research outcome is the reevaluation of the hypothesis between the physical features in the spaces and prospective student creative behavior. It was found that physical features are closely intertwined to the social and psychological affordances of space, and these aspects vary on user preference according to the *creative behavior* investigated.

Such findings expect to inform future research and evidence-based design approaches of inner-city campuses.

When finishing this research, I am deeply grateful to all that supported me in completing this study program and thesis. To God, to my beloved family, my friends and the supporting academic staff.

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1.Introduction

Research context

Creativity is a complex concept that has several interpretations and it contributes to different topics that range beyond the recurring association to the arts, extending to other fields. Such behavior is not restricted by the stereotypes of the creative genius, but based on the individual's potential allied to environmental conditions to make the non-linear connections, transfer knowledge and as an outcome develop new, useful and validated products and processes. (Csikszentmihalyi, 1996, Cropley, 2011).

More recently, discussions on the concept would have moved towards the products of creativity across the many realms, and how such products can help society. With creativity then becoming of increasing interest from government, industry and business. (Cropley, 2011,p.3). As an example of that, other researchers (Jesus, 2021, p.273) mention how government structures are changing the conceptualization of cultural industries as creative industries as they identify the potential of using the creativity element to connect technological development to intellectual property outcomes, and the novel ideas become potential economic opportunities

across several different sectors. (Jesus, 2021 in reference to Oakley, 2009).

Therefore it is relevant to investigate the individual creative behavior and how it can become a collective response to the environment. More specifically, research interest comes from the fact that in the contemporary context of the knowledge economy, creativity has an increased impact on the urban realm, especially considering the implications of the campus development for city development.

"Standardized research formulas have been widely used to investigate the role of the creative industries in the city's growth. These often have taken the form of quantitative research that links the creative industries to the city's economic development. However, very little attention was given to the internal dynamics of creative industries; how the knowledge flow and exchange were promoted within the creative industry framework."(Mengi, Onur & Velibeyoglu, Koray, 2013).

Meanwhile, on the investigation of the spatial features of campus space, previous research (Soares et al., 2020a, 2020b, 2019) had linked the campus physical features to aspects of creative behavior such as creative encounters, spontaneous encounters, socialization, meeting people from outside campus, a sense of safety, stress relief and a sense of belonging. Still, the research appointed for the need to further evaluate the user qualitative response to physical features of space and also

towards specific typologies of campus space. Furthermore, the present research includes the concept of affordances, also previously explored in urban research, as the link between physical space and human behavior, as it will be explored on chapter 2, specially on the research by Sailor, 2014 and Fayard, 2007.

In addition, it is incorporated the concept of knowledgespaces, also part of previous research, as for characterizing the campus as the environment for creativity and knowledge

related development.

As a consequence, the goal of this research is to understand the role of the campus open space physical features by the user response to this environment, translated from trends of collective behavior. It considers existing knowledge in the psychology and urban studies to develop a research approach to compare the qualitative and quantitative aspects of user creative experience to physical features of space.

Research Framework

The main question of this research is derived from existing research to address specifically which and how the physical features of the campus open space can affect the user's creativity. In order to investigate such complex interaction the research framework was developed as Figure 1.

The first phase includes gathering in-depth information to investigate the indicators of creative behavior for the individual user and how it can be informed by space, in addition to information regarding the context of the campus and the relevance for creativity dynamics, in the social, economic background, further, previous methodology for investigating such interaction user-space.

The next phase derives the hypotheses for such interaction between campus open space and creative behavior based on the previous phase of literature review. The following was to verify the hypotheses evaluating the user experience in space through the study case, also according to methodology developed from the existing knowledge in literature review.

From the findings of the case study it is possible to evaluate the previous hypotheses and extract conclusions informing on the initial question of the relationship between campus, open space physical features and user creative behavior.

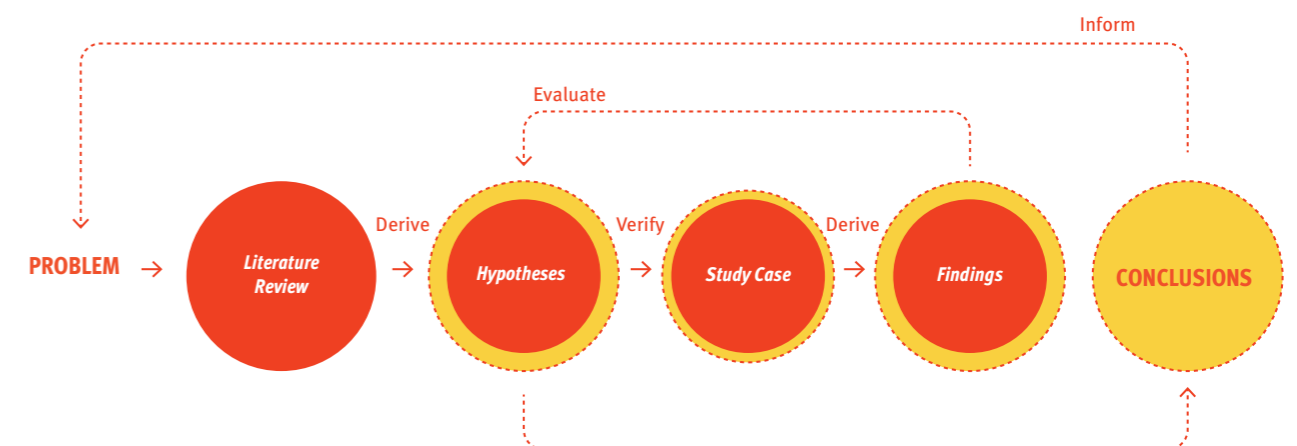


Figure 1. Research framework diagram. Source: Author, 2021.

2.Literature Review

Establishing correlations between the human behaviour and physical features of space is not an exclusive approach of this study, such approach has been already applied to a wide range of existing research in both fields of psychology and urban studies. Therefore, the following chapters seek to establish the knowledge base for hypotheses development correlating creativity and physical space, moreover, how they can be investigated.

2.1 Affordances

The concept of affordance has been investigated in many fields, with one of its most recurring definitions corresponding to “the quality or property of an object that defines its possible uses or makes clear how it can or should be used” (Merriam-Webster, 2021). For architectural background it was approached by Gibson (1976/1982,p.413 cited in Withagen and Costall, 2021, p.1) as a possible basis for architectural discourse, under a referred functionalist approach (Withagen and Costall, 2021,p.1) that every aspect of a physical object is deemed to allow a specific set of actions, informed by its features such as surfaces, shape and material.

From this perspective, the physical environment is an affordance, a precondition for human behavior. Furthermore, following researchers would expand such understanding throughout other settings of the built environment, not strictly to architecture, but also considering more general space typologies.

For example, from psychology research, Baron stated that “opportunities for action found in specific objects, places, and so forth,

can only be exploited in regard to the action modes that the person is capable of making in that environment”(2010, p.250), in addition, relating the user response to the perception of such space, specially visually, as “Further, the information specifying such affordances is outside the head—to be detected in the optic array in the course of perceiving–acting cycles of engagements with the environment.”(2010, p.250).

Furthermore, other researchers (Tillas, Vosgerau, Seuchter and Caiani, 2016) related the affordances as existing elements apart from the perception of the user. In such an approach, the user perception may be dependent on its subjective interpretation, but it responds to the existence of the affordance, with both elements being codependent (object affordance and user perceived affordance). In other words, one would not be able to identify an affordance before having the previous cognitive process of understanding it. This interpretation of the concept of affordances demonstrates that the behavioral response to a feature is a result of

both an external process (social, physical) and internal (subjective).

And such influence of affordances on behavior would affect the individual and groups, with urban researchers linking the collective behavior to collective space setting, for example in organisations, where “the physical space can be regarded as an affordance for organizational behavior” (Sailor, 2014, p.2).

In addition, many researchers refer to the affordance of space as a complex system of factors that construct the human experience. In the sense that “there is no simple, deterministic relationship between physical characteristics of an environment—such as distance, open architecture, or the presence of shared resources—and patterns of informal interaction that occur in that environment”

(Fayard, 2007,p.2). Therefore, space can inform or condition a behaviour but not define it.

The concept has been also explored, with psychological research considering the role of human surroundings as social and physical, stating “The concept of affordances, drawn from ecological psychology, provides a means of considering how the physical and social characteristics of an environment jointly influence the perceptions and behaviors of actors.” (Fayard, 2007,p.2).

For the context of this research, the concept of affordance seeks to assist understanding how the set of physical features of campus open space can be a precondition for creative behaviour, considering how the social environment of the campus is already enabling such activity.

2.2 Creativity

According to researchers in the field, creativity is associated with the development of new, ethical and effective ways to derive solutions, with its outcome being physical or intangible products such as a strategy, a process, or an artifact. (Cropley, 2011,p.2). Furthermore, creativity’s effectiveness and novelty factors were previously also reviewed affirming that the new product should promote an overall feeling of immediate surprise followed by a recognition of its value (Amabile, 1983, p.19 in citation to Bruner, 1962 and Stein, 1974).

Also, Cropley (2011, p.2), states that creativity can be used as a qualifying adjective to characterize a person, process and product that is developed

under such a “new and effective” approach, which means that creativity can be both, cause and product. In addition, the word “creative” as an adjective has been used for a successful and satisfying outcome (Kurtzberg, 2005, p.51).

For Amabile et al (1996, p.5), creativity is “the production of novel and useful ideas in any domain”. Meanwhile, other authors question creativity’s aspect of usefulness, just focusing on novelty (Al-Ababneh, 1999,p.246 in reference to Drazin et al, 1999). Therefore, according to researchers creativity can be approached as those three elements (person, process, product), later affected by the “pressure of the environment”, which can support or restrain creativity. (Cropley, 2011,p.2).

The approach on a definition comes from the conception that creativity would be a result of the individual’s process, which was evaluated as creative by peers on the same process (Amabile, 1983, p.4). Other authors expand the creativity concept beyond the individual, to organisations, stating that creativity is a continuous search process towards enhancing opportunities or finding solutions without the limits of a single solution. (Andriopoulos, 2000, p.11).

Historically, creativity has been associated with aesthetics and as a human asset allowing them to outgrow other species and even today’s machines. In addition, the investigation towards creativity would be focused on the individual and the psychological implications of such a concept (Cropley, 2011, p.4).

Another aspect is that creativity in individuals may be linked the novelty to characteristics such as “the sense of nonconformity, lack of discipline, rejection of existing and letting oneself go” (Cropley, 2011, p.6). However, the result of such characteristics would only be a creative outcome if it leads to relevant genuine solutions, with the criteria of relevance being variable according to a case-by-case situation. Therefore, creativity is identified as primarily an individual element, later validated by the social environment, depending on how the outcome of such a subjective process results is socially accepted and validated. (Cropley, 2011,p.21)

Identifying such aspects on the individual might require a subjective evaluation, with previous research relating the creative behaviour to everyday reference to “discovery, brainstorming, generating ideas, thinking flexible or “being creative””. Further than that, researchers related creativity to cognitive processes that permeate the creative process, for example, “learning, insight, realization,

awareness, clarification, remembering or focused concentration”(Amabile, Hadley and Kramer, 2002/2020, p.180).

Creativity has been also associated with the idea of “problem-solving”, and the conclusion by researchers is that creativity can be part of the problem-solving process, but not all solutions are creatively created. In addition, some researchers also see the recognition of “good” problems as a key aspect of creativity. (Cropley, 2011,p.17). Other researchers detail the quality of the problem to its complexity, for example, “algorithmic” as linear problems and “heuristic” as complex problems, with the latter leading to more creative approaches (Amabile, 1983).

Research points out that creativity may have different levels, secondary as a different application of something already known or primary as the development of something new, or minor (extending of the known) and major (going beyond the known)(Cropley, 2011). Such a hypothesis was also noted by other researchers on creativity and innovation in business, who mentioned that the transferral of methods or thinking from one field to another already constitutes a creative solution “Sometimes the complexity of a problem demands for diversity (...) Other times the application of one field’s methods or habits of mind to another field’s problem produces the breakthrough” (Amabile and Khaire, 2008, para.11).

In addition, further research (Cropley, 2011) affirms creativity also happens in different phases that require more or less pre-existing knowledge, with the “expressive spontaneity” being the “free production of ideas”, for example in brainstorming sessions, where the effectiveness of the ideas is less relevant than its amount. The “Technical creativity” is the level to require technical skills, “Inventive creativity” applying knowledge in different

ways, "Innovative creativity" expanding known principles, "emergent creativity" developing the new.

Other research (Ekvall, 1997,p.195) pointed out that there are two types of creativity, or creative individual behaviour, one that is adapting the existing conditions to reach an ideal, and one that is innovating, rethinking the whole questioning process also to reach an ideal - with both types being in the same level of creativity. Understanding such features of creativity relate to the profiling of individuals and the environment involved in the development of the creative processes.

It is possible to correlate these concepts of creativity to the sense of external validation and non-judgement environment that has been applied to educational, working environments in order to support creative behaviour, under the expectation that such behaviour results in a creative product. In such an approach, the traditional hierarchy and discipline-related relationships are lessened in order to prioritise the development of integrated and new creative ideas.

Research also questioned the hypothesis of creativity being related to "bursts of inspiration", as the development of inventive, innovative and emergent creativity in an effortless manner, which has been proven false, since creativity was correlated to long processes of knowledge development (Cropley, 2011, p.13).

Other authors (Andriopoulos, 2000 in reference to Locke and Kirkpatrick,1995,p.12) state that creative outcomes do not emerge from insights or intuitions, rising instead from prior knowledge and study of reality. In this case, the common myth of the "creative genius" becomes less connected to the talent of an individual, and more related to an underlying knowledge development that is at a specific moment modified, expressed, potentialised

by an environmental factor and externalised through a creative outcome.

Further than that, the luck component was also questioned and categorized in literature, for example, "blindchance" as for when the individual is at the right place and right moment randomly, the "diligent luck" when a hardworking person stumbles on results, the "self-induced luck" when the individual creates opportunities for a breakthrough. Some research concluded that all types are relevant for genuine creativity (Cropley, 2011,p.13). Other researchers refer to luck as a socially constructed component, stating that the creative master is actually a privileged individual who was socially attributed the chance to be at the right position, time and space to reach a creative thought, and later being also socially allowed to express and validate such production (Brand, 2015 partially in reference to Nanay, 2014, p.31).

These findings recall the understanding of how the environment is affording such situations to happen, through the background of the individuals and environmental conditions provided in spaces where creativity highly is expected, in this study, the educational campus space.

The relationship between knowledge and creativity is embedded in education, and education impacts both the individual and development. In addition, research Cropley (2011, p.14) related some aspects related to education and training play a role in creativity, for example, having knowledge, special skills and techniques. The role of knowledge is then related to the fact that it creates for the individual the basis from where the novelty of its creation should be to overcome, as well as it can also create limitations in the sense that the individual might be blocked to see outside the already existing knowledge.

More than that, there has been an increase

in the previously mentioned association between knowledge and development, with the same research stating that "there has been considerable emphasis on creative management, especially creative leadership, innovation, the management of innovation with research focusing on productivity, effectiveness" (Cropley, 2011,p.5). Developing creativity in the educational sector is also relatively recent, with current strategies stressing creative teaching and creative learning.

Individual and social affordances for creativity

Considering the aspects of creativity defined in the chapter before, there are conditions that can support or refrain the creative behaviour among individuals and reach the organisational level. Such conditions can be internal, referring to personal characteristics or from the environment. In the following chapter, such individual affordances for creativity are examined.

According to research, (Cropley, 2011,p.21), there are aspects of the context which may support the innovative behaviour or implementation of creativity, called a "congenial environment". Such concepts relate positively to providing autonomy for making decisions, facilitating attitudes and leadership and support. As a reverse condition, the absence of such conditions may inhibit innovation, and therefore the implementation of creativity.

For the individual, the innovation would be possible by a correlation of aspects, for example, acquiring new skills and the so-called "cognitive reorganization" (rethinking strategies, organizing knowledge and

reevaluating activities), in addition to personal characteristics such as openness for the new, willingness to take risks and flexibility. More than that, these individual features ideally interact with the aforementioned positive conditions of the environment. (Cropley, 2011,p.24).

For other researchers, the condition for the creative thinking process is deemed to be unconventional, by requiring the modification or refusal of previously existing ideas (Andriopoulos, 2000 in reference to Newell et al, 1962,p.12). Individual thinking can also support collective creativity by generating debates under a diverse spectrum of viewpoints (Andriopoulos, 2000,p.13).

Another aspect mentioned by research related to the individual's affordance for creativity is the personality, which research remains with the assumption that creativity emerges from a balance between different clouds of personality traits. For example, a spectrum between "autonomy, self-confidence, toughness" and "sensitive, intuitive, responsible" (Cropley,

2011,p.27). Research also mentions that socially, creativity defies the relation between individual and society through the features of a personal sense of non-conformity with societal norms, and the impulse to contest the ways in which things are done. And society has limits to what extent the questioning and unpredicted behaviour is considered as creative, variability or even offence. In this sense, the research mentions that a social environment that allows tolerance

and non-judgemental development of ideas is by essence supporting the emergence of creativity. More than just acceptance, creativity requires a sense of communication and validation (Cropley, 2011,p.21). Together with personality, also motivation is an aspect to impulse creativity, in the sense that the person needs a high level of self-motivation in order to be creative, and even excessive external support can be inhibiting creativity, with motivation types varying in external or

internal levels. (Cropley, 2011,p.29). Other authors ratify such arguments stating that excessive pressure from peers or time inhibits creative behaviour, leading individuals to seek already validated solutions or processes instead (Amabile, Hadley and Kramer, 2002/2020, p.172). The following Figure 2 defines the development process of a creative product.

More than that, creativity and its implementation through innovation, become a key element to retain competitive advantage for an organisation (Parjanen, 2012,p.109). For such collective development of creativity, researchers recognize it involves the integration of different individuals, each with a different background regarding knowledge, skills, and perspectives (Parnajnen, 2012,p.110). Such a blend would be able to address challenges that an individual could not solve alone, highlighting the recent concept of collective creativity, where the result of the creative process is not traceable to a single person, and creating new knowledge is a way of behaving, and such interactions are not restricted by hierarchical levels (Parjanen, 2012,p.112). Researchers also affirm that "The central activity of a knowledge-creating company is to make personal knowledge available to others" (Parjanen,2012,p.110), which shows that creating a supporting environment, either social or physical, for knowledge exchange across different fields is a key aspect for a creativity centred organisation (Parjanen, 2012, p.111 in reference to Carlile, 2002). In this sense, the interaction is an affordance for creativity since "statements by one may inspire ideas in another " (Kurtzberg, 2005,p.53), and such ideas should also ideally come from different backgrounds since one single individual might not have the flexibility or knowledge needed, however, such ability might be present in a diverse group

(Kurtzberg, 2005,p.53 in reference to Rubenco and Runco,1995). Therefore, the social affordance for creativity, and the collective creative behaviour relates to the core definition of creativity in which the individual needs the sense of group validation and belonging, and more than that, the individual affordance for the creative behaviour is informing the collective creativity.

Physical features as potential affordances for creative behavior

The previous chapter clarified that the capacity for creativity lies on the individual, but it is also performed collectively and highly influenced by the environment as it can afford a certain type of action. As a consequence, the approach of "creative behaviour in space" fostered both spatial research understanding the space shaped by the behavioural response, as well as from psychological research, from behaviour informed by its interaction with space. The following research analysis seeks to find a common basis between these approaches, to trace the current findings regarding the physical affordances for creative behaviour.

The study by Sailor (2014) and Fayard (2007) considered physical elements associated with creative behaviour, at the architecture scale, while Csikszentmihalyi (1996) investigated the psychological affordances for creative behaviour. For the first, "Space is seen to influence the probability of certain behaviours, but not the individual behaviours themselves"(Sailer, 2014, p.17), since the individual behaviour would be processed subjectively. Meanwhile, for the psychology research such influence of the physical environment becomes intertwined

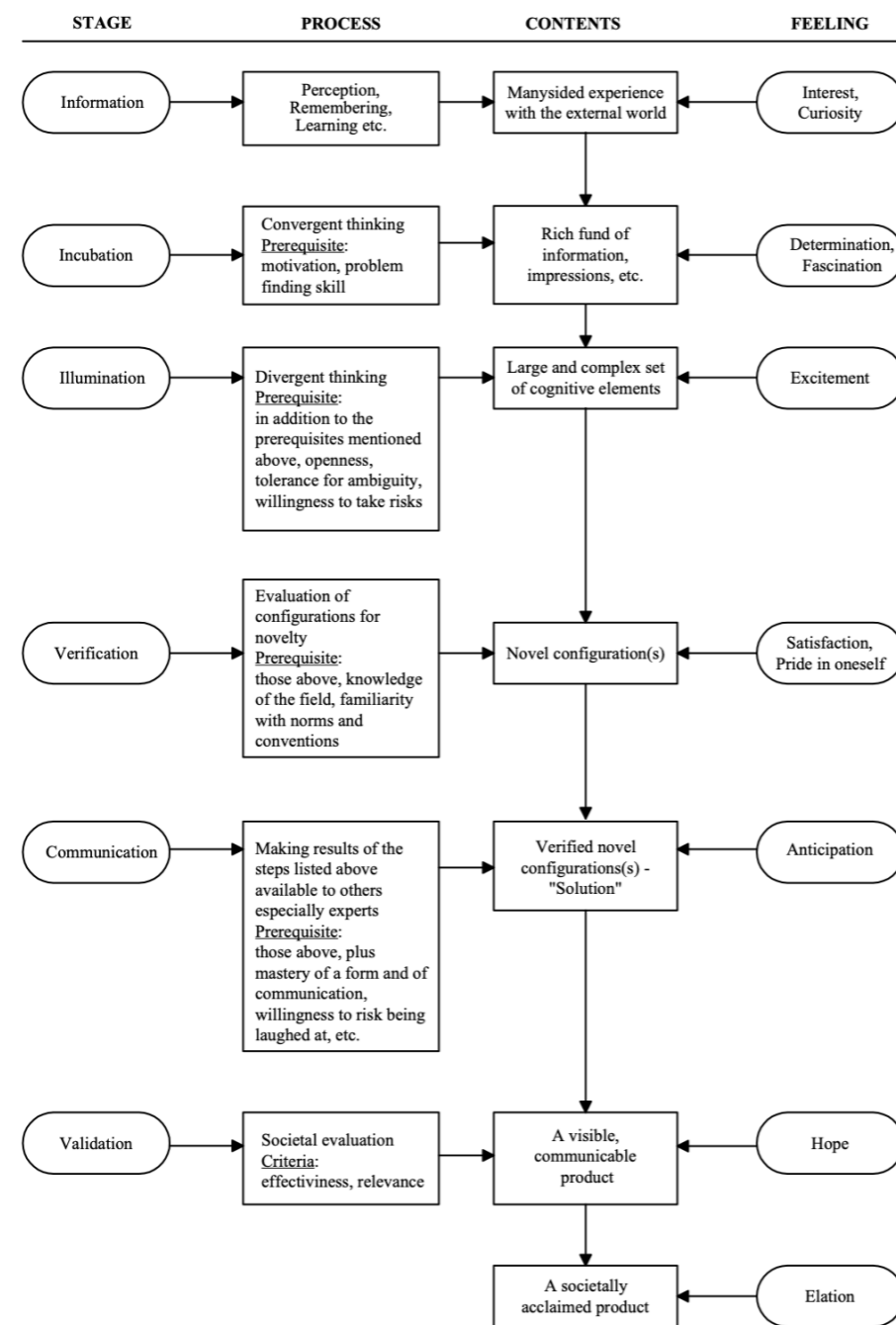


Figure 2. The psychological process involved in achieving a creative product. Source: Cropley, 2011.

with social conditions, as “Although personality plays an important role in intrinsic motivation, the social environment can also impact on the level of intrinsic motivation of individuals” (Al-Ababneh, 2020 in reference to Amabile,1997), additionally, “No one is immune to the impressions that impinge on the senses from the outside. Creative individuals may seem to disregard their environment (...)But in reality, the spatiotemporal context in which creative persons live has consequences” (Csikszentmihalyi, 1996).

The research by Sailor (2014), conceptually supported by the body of work by Hillier, Burdett, Peponis, and Penn (1987), describing “cities as configurational and spatial structures” (Sailor, 2014,p.17), platforms for the social interactions and the unfolding processes of such development, affirming that:

“Cities are mechanisms for generating a potential field of probabilistic co-presence and encounter. What happens beyond that is not the direct effect of the city, but an effect of culture. The prevailing culture may, however, itself be an indirect, evolutionary product of the city... The field of probabilistic co-presence and encounter generated by an urban layout has a definite and describable structure, one which varies greatly with the structuring of space; it can be sparse or dense, localised or globalised, predictable from the intelligible structure of space or unpredictable, and mix inhabitants and strangers in different degrees. In other words, the pattern of co-presence has both a describable pattern and a known cause” (Hillier, Burdett, Peponis and Penn, 1987, p.248).

The research by Sailor (2014) questioned how creativity can be promoted in a collective environment, considering that there are organisational elements which can foster the creative behavior, then referred to as collaboration, interaction between individuals and knowledge flow. Furthermore, the author relates to Hiller (1996) that also identified a degree of randomness into the patterns of socialisation such as “knowing each other, interacting, and collaborating” (Sailor, 2014,p.10), which informs this research as they are also related to elements that foster creative behavior.

According to research experiments, individuals have a framework, a sequential process in which they develop a collaborative process. First they would recognize the potential for working together, then people would identify the limitations and advantages of their collaboration, then consider how to combine work (Sailer, 2014,p.13). Same research also concludes that intrinsic shared and collaborative processes need the organisational support to be “accommodated” by physical space (Sailer, 2014,p.14).

The diversity and informality in encounters relating to opportunities for collaboration was also a factor reported by the other researchers. According to the review by Fayard (2007) several studies have proven that informal meetings under a work environment are strongly relevant further than the individual's relationships, it impacts on innovation production, efficiency, and higher cross-functional cooperation. On the other hand, the lack of such interactions due to organisational, physical or technical restrictions may be a negative factor towards all of these aspects that ultimately relate to a threat towards creative behavior.

In her research, Sailor attributes the collaboration and interaction patterns to a

combination between the social and physical aspects of the environment. The sharing of space would allow the collaboration between people who were not otherwise expected to collaborate either by their organisational level or field. The sharing and mode of use of space was a physical aspect shaping the “patterns of communication”, and therefore potential creative affordances, which was also even defined by trivial organisational routines, as such meetings and meals “transpatial forms of solidarity (routines, social events, and expertise) provided the necessary “social glue” for the organization and its emerging collaboration patterns” (Sailer, 2014.p.12).

Furthermore, there findings in the study that emphasise the administrative factors as supportive elements of creative behaviour (collaboration and interaction), mentioned by the author (Sailer, 2014) as “granting a great deal of autonomy to the groups, supporting the groups and individuals, employing IT staff, affording a variety of physical spaces, and allowing for unconventional usage and appropriation of the spaces”. In this sense, it noticed that the openness of the administrative approach was not only allowing the individuals to collaborate by giving space, further deliberately fostering interactions.

Another observed affordance of physical space towards interactions is distance, which according to research “distance curves have shown that intense interactions have a higher probability of taking place if actors are located in proximity to each other” (Sailor, 2014, p.17) and “ local clusters and spatial as well as relational proximity as important conditions for organizational learning” (Sailor, 2014, p.2, in reference to previous studies by Amin & Cohendet, 2004; Amin & Roberts,

2008; Faulconbridge, 2006; Gertler,1997, 2003; Malmberg & Maskell, 2002; Maskell & Malmberg, 1999). However, in the same research the author recognises that proximity was not as influential as the previously mentioned social factors of co-presence and “social-glue”.

Also for proximity, “psychological studies of propinquity which show that interaction may increase attraction—perhaps either because interactions increase familiarity among actors (Zajonc,1968) or because they increase the similarity of actors”(Fayard,2007, p.2).

Such conclusions can also inform on the understanding of how the physical and organisational distances may impact in campus space, as the short distances organisational or physical might increase the likeliness of the interactions, and creative behavior, to happen. Specially in the case of the campus design in the arrangements defined by Faculties, Courses or Degree levels.

According to such findings, spaces that are closer and near to key spaces might foster higher levels of interaction and collaboration than others (Tobler,2004,p.304), which was also affirmed in the research that stated “All things are related to one another, but near things are more related than distant ones”(Fayard, 2007, p.1, in reference to Tobler, 2004). From the same study it was also assumed that long physical distance was an obstacle for formal interaction; it could be only overcome by social organization strategy, as informal interactions. Even convenience in terms of location would also be related to distance, as the author called it “convenience theory”, of which one would engage with convenient elements along or near its domains, in the sense that convenience would even support interaction diversity “Such a view is supported by Estabrook and Sommer's (1972) study of university professors showing that faculty members were less well

acquainted with colleagues on different floors than with those from different departments located on the same floor” (Fayard, 2007,p.4).

Another aspect of distance in its relation to interaction is that the distance value is important in scale, but still “the literature suggests that the effects of metrical distance are significantly moderated by the physical layout of offices and workspaces in shaping informal interactions.” (Fayard, 2007). Which also informs that the distance may refer to the metric value and also how this distance is constructed between spaces, and which elements in layout may influence distance as a factor towards interaction.

The location factor was also mentioned by Csikszentmihalyi (1996) stating that individuals prone to creative behaviour would cluster around the perspective of reaching relevant assets to realise or develop their projects, that is exemplified for being close to relevant people (by a different or inspiring background), knowledge, funding, social validation. By consequence, the presence of these aspects or expectations of them in a given location can be seen as affordances for creativity in that space.

In addition, centrality and accessibility factors in the office cases would be associated with the experience of space. However, the openness and interdisciplinarity of the environment also added another random factor to the experience of the space. In other words, people would be interacting more within shorter distances, yet they would also interact based on the curiosity and collaboration prospects given by the social space, as stated “*spatial configuration may exert a generic function on basic anthropological constituents such as occupancy, movement, and awareness. On the other hand, people regard the relationship between space and organization as being*

shaped by the interplay between forms of spatial and transpatial solidarity”(Sailor, 2014,p.17).

According to the same research, the arrangement of the layout, presence of furniture, walls and other physical elements in the case of the office also influenced the distance-interaction relation, a hypothesis that might also be valid for other typologies of space, including open spaces. Where researchers (Whyte, 1980) have empirically proven how the role of amenities in space such as seating, shading, water features, among others, impacted the user experience in public space, including the possibilities of socialisation.

In the research, it is also clear that the barriers such as the layout, furniture and other elements impact the perception of distance, as well as the position of an element in relation to others in terms of potential for interaction. For example, having a highly relevant facility at close distance, “occupying an office across from the restrooms offers enhanced opportunities for spontaneous interaction with others”(Fayard, 2007,p.3).

From the spatial analysis, the aesthetic and climatic factors (e.g., temperature, light, climate, comfort) matter most at the level of the individual preferences towards the space. The same goes for colors, materials, forms, perception, and workplace satisfaction (Sailor, 2014). For the psychological effect Csikszentmihalyi (1996) claims that such environmental features should provide a complex sensory experience (including pleasing and stimulating view, smell, sounds even taste and feel of fresh air), which helps the individual to feel stimulated with enough psychic energy and free mental space to pursue the problematic question that requires the creative, new solution.

Another feature of space would be to provide

the individual with the condition to perform semi-automatic activities. Such activities would allow the individual to be engaged in behaviour just enough to free the “background” (conscious intentionality) of the mind to wander around the possibilities of problem-solving without the pressure of performing a linear sequence of thought. Examples of such activities are eating, walking, exercising, playing and even driving (Csikszentmihalyi, 1996).

Csikszentmihalyi (1996) further explores another creative affordance of space, the allowance for experimentation and adapting to one`s expression on such space. “Having a home that reinforces one’s individuality cannot but help increase the chances that one will act out one’s uniqueness” (Csikszentmihalyi, 1996, Chapter Creating Creative Environments, para.15). While he refers to the home as the place for individual expression of self, such analysis could be transferred to the public space as it might be the place for collective expression, appropriation, improvisation and experimentation.

This concept was also largely applied by the placemaking approach, which considers “*The degree of improvisation in a public space can be both a positive and a negative indicator of how comfortable a public space is. On one hand, more spontaneous social interactions and activities happen when people feel safe, welcome and comfortable. On the other hand, improvisations can also be a sign that something is lacking in a space.*”(PPS, 2018a), furthermore, “*A public space that inspires improvisation is rich with “affordances,” a psychological term for those things in the environment that beckon us to interact. For example, a moveable chair offers many more affordances than a bench. While you can certainly sit on a bench, many are designed*

specifically to discourage any other kind of activity—no picking it up and moving, no supports for eating, drinking or working, no lying down, no adjusting your distance from strangers. Moveable chairs, on the other hand, invite more than just sitting; they can also become a makeshift table, workspace, footrest, or they can be rearranged to create an instantly better social situation.” (PPS, 2018b).

Meanwhile, physical space has features that interfered in the creative process by supporting individuals with comfortable space for gatherings, encounters and co-presence “*The spaces at the institute gave them enough room to unfold and not only made for a rich variety of meeting opportunities and additional temporary working areas but also created an open atmosphere by means of wide corridors, bright and sunlit spaces, and high visibility within the institute (...) the spatial configuration of the institute was likely to continue to shape patterns of interaction and collaboration by forging groups of individuals previously unknown to each other*” (Sailor, 2014,p.16).

Such findings exemplify the non-linear relationship of the physical and social conditions of the environment and its consequences for creative behaviour. That does not disqualify the possibility of analysing the physical aspect but states how it is not detachable from its social condition. This challenge of research was also affirmed by researchers “*We argue that these seeming contradictions can only be resolved by framing the research within a theoretical perspective that takes into account the social meaning of the physical environment and takes seriously the idea that the physical artifacts and social constructions of organizations are mutually constitutive*”(Fayard,2007, p. 1 in reference to Kornberger and Clegg, 2004).

2.3. Knowledge Economy, knowledgescapes and creativity

As knowledge creation and exchange are, as stated in previous chapters, outcomes and conditions for the creative process, exploring the idea of “knowledgescapes”, creative city and its term variations is appropriate for understanding creativity.

Over the past decades, there was an economic shift from Fordism to post-Fordism, expressed in the form of the knowledge economy, and with this effect, there has been an increasing focus towards understanding the impact of urban development, innovation and competitiveness (Asheim, Vang and Coenen, 2005, p.2). With a variety of terms, several researchers have investigated such phenomena in their creative cluster study referring to it by the increased interest in the relationship between creativity, culture and economics (Mengi, Onur & Velibeyoglu, Koray, 2013, p.23). Moreover, previously mentioned authors expressed how the literature from other researchers such as Laundry (1995), Florida (2002), Leadbeater (2000), Hall (2000) along with others, have investigated such economic focus, naming this new economic approach first emphasizing the term “knowledge”, then later on “creative”. This consideration of the terms can also inform how the idea of knowledge was complemented later by the “newness and effectiveness” aspects of creativity.

In this contemporary economic development approach, knowledge is the key asset for generating value, and therefore, the process

and spatial conditions for knowledge creation also receive increasing attention. Although the vocabulary related to knowledge development has been trending in several media and educational environments, according to literature, Creativity as an asset in global competition has not emerged in the context of the knowledge economy, but dates from decades before when creativity was a tool to keep up in the space race competition in the 1950s (Cropley, 2011, p.5).

In addition, the creation of knowledge becomes a key asset in terms of keeping advantage and retaining it since it “embodies intangible assets, routines, and creative processes that are difficult to imitate”(Parjanen, 2012, p.110) and therefore the link between creativity and knowledge creation as crucial element for the differentiation in an increasingly competitive scenario.

Furthermore, knowledge-based development through creativity is a key component to reach quality results, as stated: “the key to success in a knowledge company is to built the intellectual capital that will create core competencies and distinctive products that will lead to superior

results” (Parjanen, 2012, p.110) - Such statement evidence the quality factor related to the core definition of a creative outcome, a novel and useful product. Knowledge creation also would emerge from creating new concepts through the management of dialogues as the exchange of ideas (Parjanen, 2012, p.110 in reference to Nonaka & Takeuchi, 1995).

Authors argue about how the communication and socialisation process around innovation, as the implementation of creativity, would have spatial implications, including a crescent pressure on urban environments as they became a concentration for such interactions “cities are central units for creating innovations, and subsequently competitiveness, in industries drawing on a symbolic knowledge base such as the creative industries.”(Asheim et al., 2005, p.2). According to further research, interactions would promote the rise of social capital, which is an asset for the knowledge economy as “*the interactive learning perspective emphasizes the importance of co-operation [!], which can be improved and strengthened by the existence and building of social capital. Moreover, it positions such processes within broader societal and institutional contexts*” (Asheim et al., 2005, p.4).

Furthermore, research has found a complex relation between space and social interactions, which are defined by the environment of knowledge development “The factual pathways of knowledge-based spatial developments increasingly depend on a wide range of untraded, but economically crucial interdependencies and knowledge-based context formations” (Matthiesen, 2009, p.10). In addition, Matthiesen (2009, p.15) defined knowledgescape as the sociospatial condition in which the many milieus that surround knowledge, and knowledge variations (Figure 3), can be arranged, including soft and

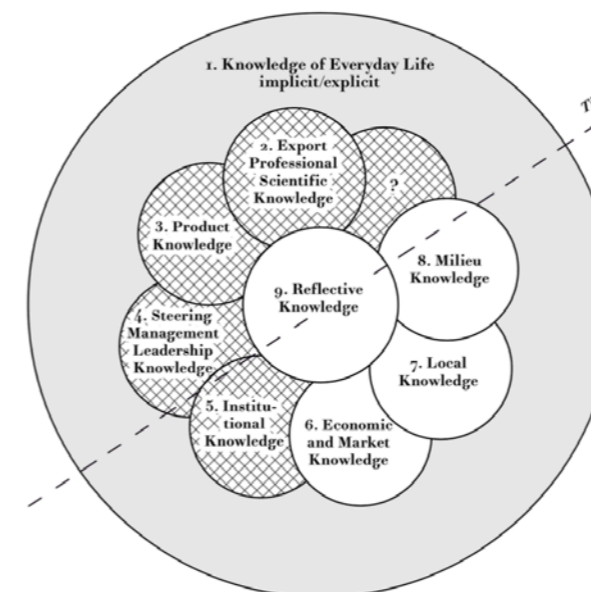


Figure 3. The typology of spatially relevant knowledge forms. Source: Matthiesen, 2009.

hard networking patterns (formal/informal relationships) - expressed by the diagram (Figure 4).

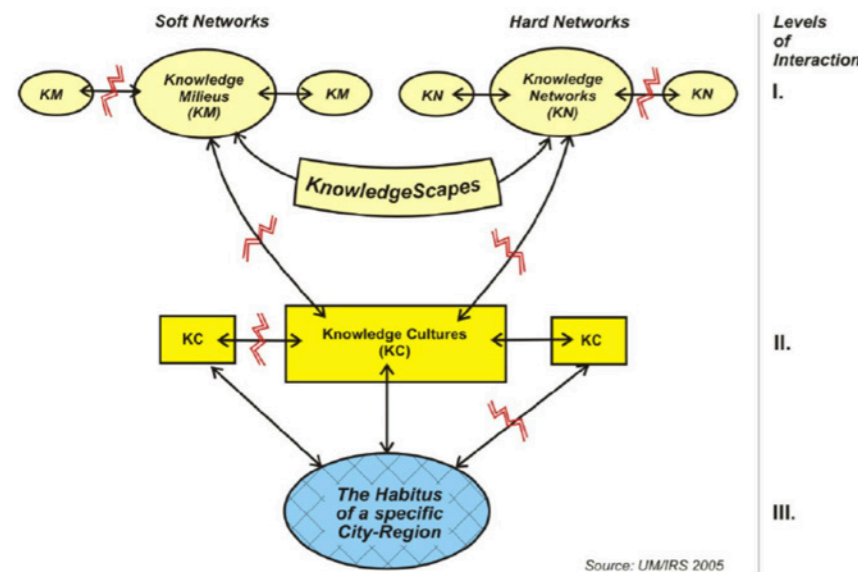


Figure 4. Diagram of relations between different networks, levels of interactions and its spatial expression. Source: Matthiesen, 2005.

Levels of Interactional Dynamics: Options and Conflicts

In his analysis of the interactions between the different components of the relation knowledge-spatial development, Matthiesen (2005) describes the Knowledge Milieus, as soft networks, as one of the components which relates closely to creativity. The nature of the informal, intense exchange of tacit/explicit knowledge would be a starter for innovative breakthroughs and a precondition for creative processes. Meanwhile, such a dimension of knowledge would be lacking in the attention of research or policy development due to the complexities of identifying such types of interactions. (Matthiesen, 2005, p.9). In the same chart (Figure 4), the author relates the concept of "Habitus of a City Region", which means that the blend of several knowledgescapes and later, of knowledge cultures, would form a Gestalt of knowledge development expressed on space. Such effect would justify the differentiation between several knowledgescapes and their

further image, branding and value creation (Matthiesen, 2005, p.11). Other research from Trip (2007), analyses the production by Florida (2002) to define the qualities of a creative place. It approaches creativity and urban space under the perspective that a group of individuals would be preconceived as creative on itself, and such a group would shape the qualities of an environment. It considers that more developed economies would focus on a certain target group of individuals preconceived as "creative", by Trip named "problem solvers" who produce new ideas and technology, such group includes "economists, legal, financial and ICT advisors, engineers, physicians, scientists, journalists, artists and managers" (Trip, 2007,p.502). Furthermore, Trip (2007) recalls the elements of urban environment by Florida (2002) that would relate to aforementioned competitiveness to attract such specific target groups, features such as attractiveness, diversity and tolerance

(Trip, 2007, p.502). Such an approach by Florida (2002) was considered assertive by considering the relationship between economic development and creativity. In addition, the analysis by Trip (2007) compares Florida (2002) to the approach by Pacione (1982), Foster (1977) and Harvey (1989) and Clark et al. (2002) which respectively evaluated such quality of place factors by its subjective factors, relationships to firms, social instead of economic infrastructure, the city image on attracting influential individuals, lifestyle and amenities (Trip, 2007, p.503). According to Trip (2007) in analysis to Florida(2002), the attractive elements for the creative class would be more or less identifiable in space, with the first including economic and spatial diversity, relevant cultural and leisure activities, "Third places" that promote informal meetings, safety and vibrancy. As for the indefinable aspects it includes "authenticity, tolerance, street life, buzz, and urbanity". In addition, it would include an even more intangible aspect, authenticity, with a subjective evaluation of its presence. Due to the fact that so many of the creative city

features for these authors are intangible, the quality of the place requires both quantitative and qualitative analysis (Trip, 2007,p.503). Finally, Trip (2007) recognizes a limitation on the research by Florida (2002), that supposedly presents some biases considering the role of diversity and innovation, as for diversity associated for example, mostly with the presence of bohemians, foreigners and gays (contemporary research would not address sexuality at this term, instead for LGBTQA+) and innovation being liked mostly to the technological scene (for example related to the silicon valley), and overlooking other scenes of design and entertainment (Trip, 2007, pp.506,514). Another mentioned factor in Trip (2007) regarding Florida (2002), would be the access to leisure, cultural amenities, nature and recreational areas (pp.506, 508). As for standing with the research by Trip (2007), the indicators and elements mentioned (Table 1) are not to define specifically the quality of a place, but they certainly present aspects that capture the "symbolic value" of the creative city (p.513).

TABLE 1

Main Elements of Quality of Place and Indicators Suggested by Florida and Related Literature

Quality	Indicator
Diversity	Functional diversity, distinctive neighborhoods, sufficient density
Specific amenities	Individual sports facilities, recreation areas and restaurants per capita; (semi-)public spaces for informal meetings (<i>third spaces</i>)
Liveliness; culture	Cultural and musical events; live performance venues per capita
Technology; innovativeness	Patents per capita; relative percentage of high-tech output
Talent	Percentage of people with a bachelor's degree and above
Creativity, bohemia	Percentage of artistically creative people
Tolerance; openness	Relative percentage of foreign-born people; <i>idem</i> gays
Aesthetics	Architecture; parks; urban heritage
Environment; sustainability	Natural environmental assets; environmental quality; reuse of older industrial sites
Safety	Crime figures

Based on: Florida (2002a, 215 ff.; 252; 255-8; 331-4; 2005a, 37-41; 2005b, 57 ff.), Kloosterman (2001, 13-4), Glaeser et al. (2001, 35 ff.) and Gertler (2004, 7-10).

Table 1: Main Elements of Quality of Place and Indicators suggested by Florida and Related Literature, from "Assessing Quality of Place: A Comparative Analysis of Amsterdam and Rotterdam" by Trip, J. J., 2007, Journal of Urban Affairs, 29:5, 501-517. Copyright 2007 by Urban Affairs Association.

It is relevant to notice that the rise of cities as ecologies for knowledge creation, interaction and sharing can also be a result of the previously mentioned tendency of creative behavior to cluster around the availability, or idea of, relevant knowledge. In this sense, the spatial organisation towards knowledge, expressed by the concepts of knowledgescape and creative city, becomes the affordances for an individual's creative behavior.

Such argument is supported by previous creativity and space investigations which mentioned that "The role of university campuses and science parks has essentially

remained the same over time: they are spatial clusters that are conceived as environments to foster contacts and informal networks based on frequent face-to-face interactions" (Soares et al, 2020b,p.1).

Finally, it is possible to recall the understanding of knowledgescape as the space background where the interactions would take place between individuals surrounding the same social, and organisational milieu of knowledge, and the environment of knowledgescape would be affected by the features of space.

2.4 Precedent Case Study: The study of the dutch campuses

The research investigating the campus space and the student behavior towards creativity is a relatively less explored field of study. The research presented by Soares, I, Yamu, C and Weitkamp, G in a sequence of articles published in 2020 investigating the dutch campuses of Groningen, Amsterdam and Utrecht developed a path towards understanding the relation between educational space and creativity.

The first article published in October 2020, investigates the "Public Spaces as Knowledgescapes: Understanding the Relationship between the Built Environment and Creative Encounters at Dutch University

Campuses and Science Parks". It compared the different spatial conditions at campus typologies the inner city and science park, to the user response regarding one of the most important aspects for creativity, the creative encounters. Such approach applied a mixed method approach, by contrasting the user-collected geographic information regarding their places for sharing ideas, to urban analysis in the land-use and spatial configuration of both campus typologies and ultimately to photographs of specific points of interest. As a result, this article presented a valuable set of correlating aspects of the relevant campus

spaces for encounters, such as the variety of urban functions as a way to support "guided creativity" (Soares et al, 2020a, p.24) and inner-city campus would have less points of polarisation for students reference than the science parks (p.25). Lastly, this article presents a space for further research which should further examine the social demographic differences of groups occupying the spaces, and also a higher focus on the qualitative aspects which user affected momentary perceptions (p. 25).

The following article was published a month later, "The Relationship between the Spatial Configuration and the Fourth Sustainable Dimension Creativity in University Campuses: The Case Study of Zernike Campus, Groningen, The Netherlands". In this article, the same authors deepen the research also correlating the user experience to the campus space, focusing on the "autonomous urban fabric typology" (Soares et al, 2020b, p.6), similar to the science park typology approached by the previous article.

In this last study, the authors applied again the mixed-method approach in order to develop an in-depth understanding of such relation creativity-space. When collecting the user perspective, the concept was associated with social aspects, asking participants about spontaneous encounters, socialisation and meeting people from outside campus. Later on, it crossed the information from user to the street network analysis, in order to evaluate the accessibility levels of space based on Bill Hillier's space syntax theory "For the analyses, we applied the normalised angular choice measure (NACH) to calculate the 'potential through-movement'" (Soares et al, 2020b, p.8). As a result, the research stated that "outcomes of this research showed that creativity does not only depend on the accessibility of these public

spaces or street segments, but also relies on the mix of active land use and activities, such as cafés, restaurants, green paths and urban seating. In contrast with the spatial configuration, the physical features and land-use mix appear to have a greater influence on creative encounters." (Soares et al, 2020b, p.16). This research also appointed a direction for further research addressing "the procedure of combining and categorising spatial configuration analysis with space syntax and VGI perceptual data should be reviewed. Both aspects play a fundamental role in understanding the use of public spaces and the richness of the community on campus; however, the datasets have a quite distinct logic." (Soares et al, 2020b, p.16-17).

Previously, the authors have also published a conference paper examining the same campus' features on the aspect of wellbeing, how it could impact "socialisation, a sense of safety, stress relief and a sense of belonging" (Soares et al, 2019, p.4) and the pedestrian movement predicted by space syntax theory.

This background research development informed the present research since this research sought to address the gaps presented by the prior research, therefore here deepening the existing research question, especially with the qualitative approach to the user experience and explore the specificities of the open spaces at the campus. Moreover, it also takes into consideration the knowledge already validated, for example the mixed-method approach and conceptualization of the campus as a knowledgescape.

3. Research Question and Hypotheses

The main question for this research is which and how the physical features of a university Campus open space would impact the user's creative behaviour. Based on the existing knowledge, it was possible to draw the hypotheses on the context of the question, the definition of the variables and the expected relationship between them.

The basis of this study is that creativity can be scientifically investigated as the expression of creative behaviour, which in its turn is embedded in trivial human actions informed by the physical and social environment. Accordingly, considering a cause-consequence relationship between the environment (psychological, social, physical) and creative behaviour.

The argument is that the social and psychological environment has several implications on how individuals perceive the physical environment, and there are already proven patterns of psychological processes for

creative behaviour that are facilitated by the physical environment, as stated in Chapter 2. A condition to the main research approach is that the physical environment informs people's behaviour in space, and by doing so, it affects their creative affordances.

Additionally, such physical affordances for creative behaviour would be linked to the individual's interactions with other people and the space, which for example, in previous research which linked creativity to knowledge exchange, diverse interactions and relaxation, as reviewed in chapter 2.

The following hypotheses are the result of correlating the creative behaviour affordances validated by literature in the previous chapter to trivial situations in space, and ultimately investigate which features of space would foster such behaviour, and by consequence, creativity. (Figure 5).

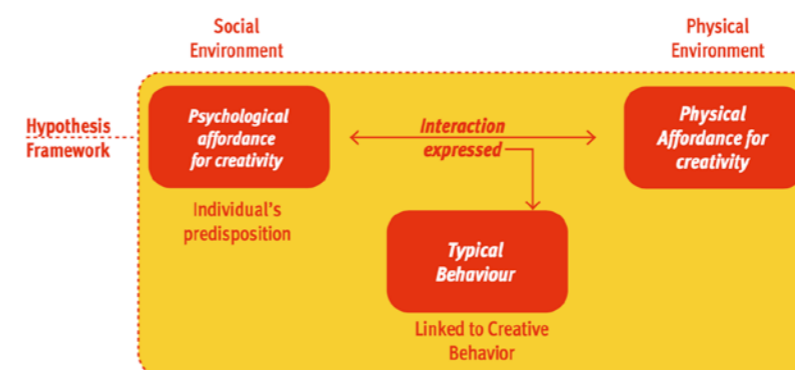


Figure 5. Diagram of hypothesis framework. Source: Author, 2021.

Subsequently, the overlapping of physical conditions for different aspects of creative behaviour would be an evidence of the correlation between creativity and physical space. Whereas the absence of such features would indicate that the isolated creative behaviour in space might be conditioned by

other factors, not necessarily the environment, for example, an organisational factor. From the literature review it was possible to derive four hypotheses of specific physical features of space and its relation to affordances for actions as indicators of creative behavior (Fig.6).

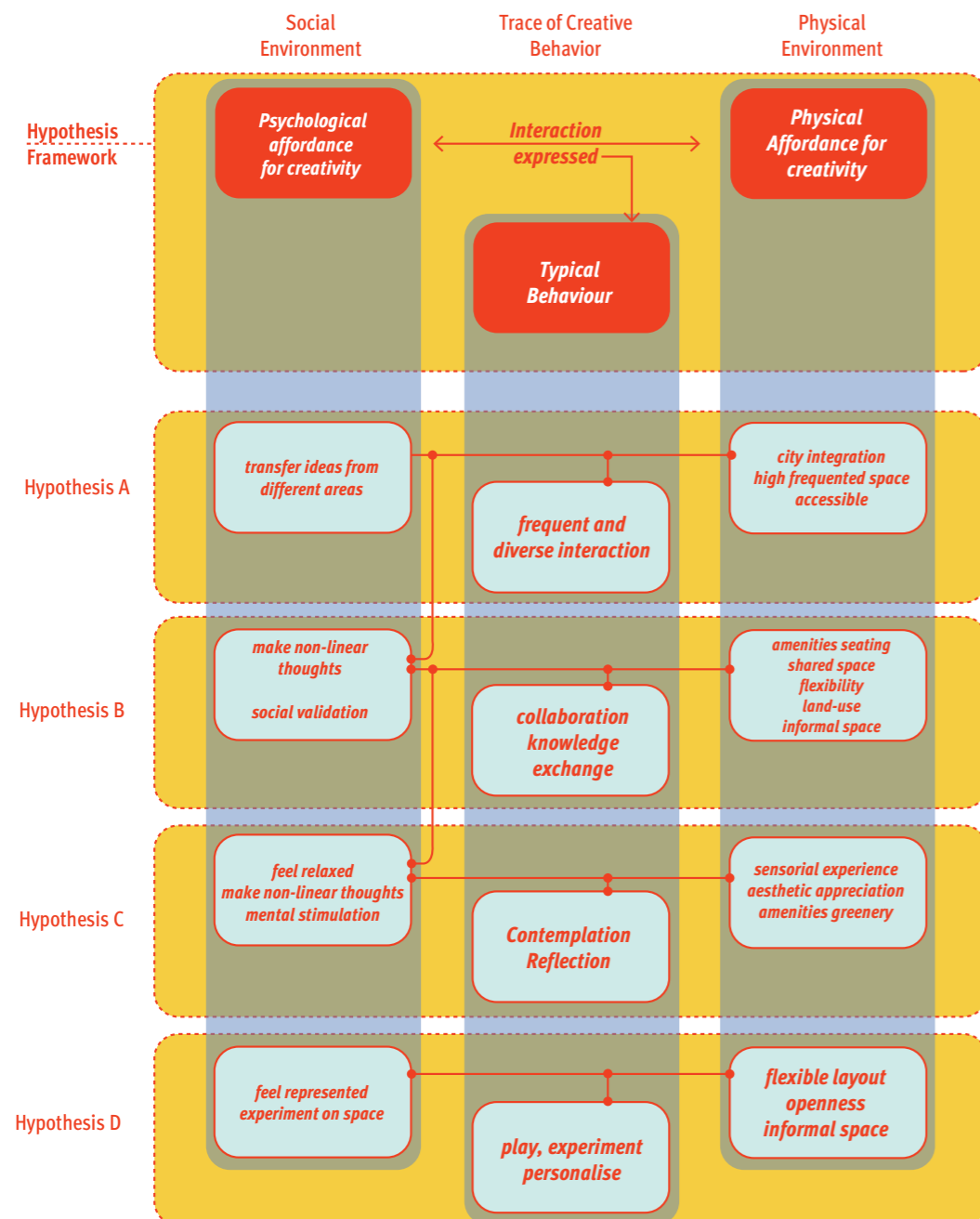


Figure 6. Different hypotheses regarding creative behavior and physical space, based on review of Chapter 2. Source: Author, 2021.

Firstly (Hypothesis A), considering that spaces that are more frequently used and occupied can more likely inspire encounters between people from diverse backgrounds, and therefore help them to transfer ideas from different fields, and make non-linear connections, what previous researchers had defined as “creative encounters” (Soares et al, 2020a, p. 1). Correlation considers existing research findings of physical features of “more frequently used space” regarding accessibility, and land-use to knowledge exchange likelihood between diverse users (especially considering city and campus) as an affordance for creative behavior.

Another hypothesis (Hypothesis B) is that spaces that are inviting for people to collaborate in groups are spaces that foster creative behavior, by allowing discussion about the same field in exchanging knowledge in a non-formal setting where the social validation and pressure is lessened. The physical features linked to such informal settings are the shared spaces, comfort, same field exchange and where there is also a level of personalisation and flexibility of space (especially present in the research by Amabile, Cropley, Csikszentmihalyi Sailor and Soares reviewed, on chapter 2).

The third hypothesis (Hypothesis C) is that spaces that offer a variety of sensorial experiences and aesthetic appreciation support contemplation and, as a consequence, non-linear thought connections, relaxation, and mental stimulation. This reasoning comes from the understanding of another phase of creative behaviour, in a non-socialising dependent phase. However, even in such an individual dimension, the overall user response to the space would not be correlated to the single personal experience, linked instead to a consensus regarding physical

features that provide comfort, amenities and aesthetic preference (Cropley, Soares and Csikszentmihalyi (Chapter 2))

The last hypothesis (Hypothesis D) is that spaces which allow people to perform urban semi-automatic activities, appropriation and experimentation lead people to make non-linear thoughts and therefore be more creative. This assumption relates previous knowledge on the psychological condition in which the individual is influenced by space when allowing the body and consciousness to perform an activity while leaving part of the mind free to develop creative thoughts, in addition to feeling represented in space. It takes place by individuals alone or acting in groups, and can be conditioned by space affordance to perform uncompromised activities, for example crafts, eat, exercise, play. The physical features providing such a range of behaviour demonstrated very wide and varied from every individual. (Present on previous research by Csikszentmihalyi and PPS (NY), Chapter 2))

4. Research Methodology

The research methodology establishes a strategy to investigate the previously mentioned hypothesis, the approach has considerations similar to the study by Sailor (2014) stating that “not taken physical space to be the sole determinant of human behaviour” (p.17), in other words, the social and physical environment are the creative affordances that influence the human behaviour, in this case, the creative behaviour. Therefore the research design should consider both aspects, however, in this research the goal is to focus on the physical environment as “Physical space understood as design choices that govern supra individual behavior” (Sailor, 2014, p.2). Every hypothesis was composed of research-based individual behaviour linked to creativity, correlated to previously proven physical features of space connected to such behaviour. To test such a hypothesis, the research design seeks to perform a case study, in which a mixed-method analysis compares the quantitative and

qualitative information about the environment and the behaviour. The case study chosen is the university campus, which by its definition is a spatial form of knowledgescape, and composed as a set of environments where creative behaviour is likely to take place. As previous research had focused on the enclosed spaces or the entire campus (see chapter 2.4), this study focuses on the open campus space, as a form to isolate the role of such space typology on the individual's creative behaviour. The strategy is to find a pattern on a set of user responses regarding the creative behaviour, and then compare it to physical features of space and verify whether there is a connection., as mentioned in previous chapter of hypothesis.

A similar research approach for analysing physical space and creative behaviour has been previously applied, in the study of Dutch University Campuses (Soares et al., 2020a, 2020b), however, for this present research different approaches on creative behaviour and methods have been applied to suit the context and to investigate precisely the open spaces of the campus, with special focus on the qualitative user experience. The first step of the study case is to investigate the context of the Bauhaus University Weimar, understanding its context, what are the features of such a university campus and how it functions as a knowledgescape and creative cluster. The next phase includes performing a questionnaire in which a selected target group of such knowledgescape, collecting information on qualitative and quantitative aspects regarding user's behaviour associated with creativity and the related campus space.

The next phase is to process such data analysing possible trends for each aspect. Parallel to this questionnaire the following phase includes the urban analysis regarding the campus space physical features related to the creative behaviour in the hypothesis: accessibility, land use and amenities. The next step is crossing according to the hypothesis framework, the place-referenced information from the questionnaire and the urban analysis, the identifying trends. The last step is to evaluate the highest rated spaces from the questionnaire from an ethnographic perspective, using the TESS (Tool for the Ethnographic Study of Space, Low, Simpson and Scheld, 2018) to observe the user experience at the eye level, and their behaviour on the campus open space getting more in depth information on the relationship between user and physical features of space, in order to reevaluate the hypotheses.

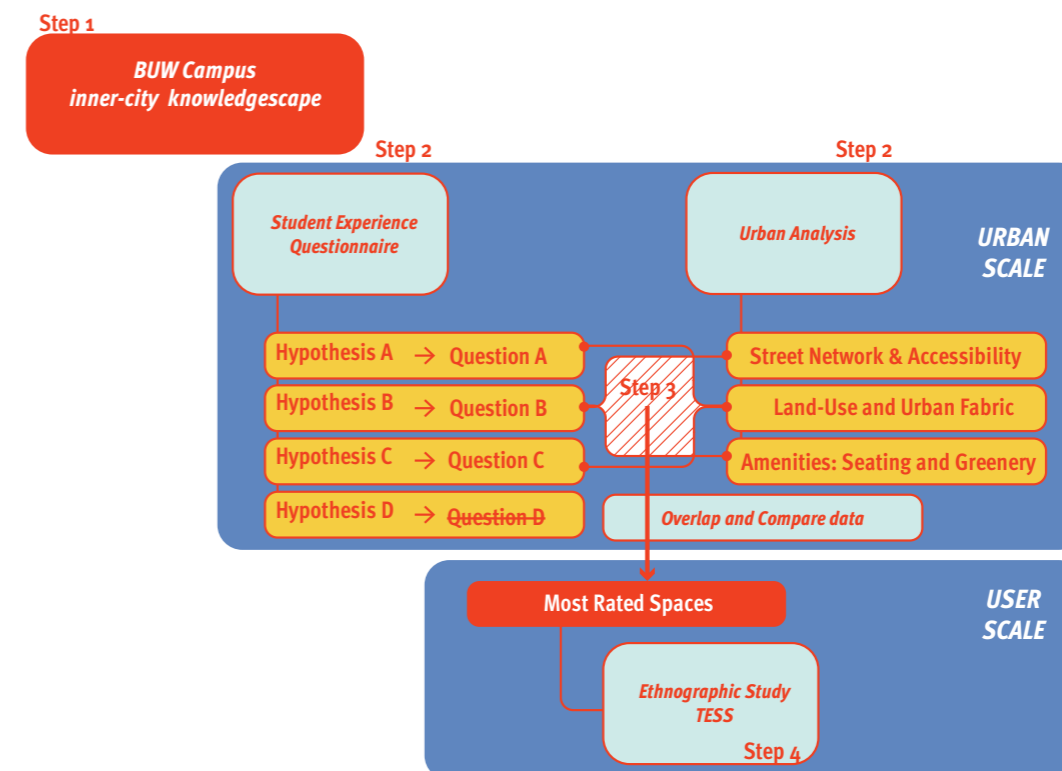


Figure 7. Study case methodology. Source: Author, 2021.

5. Case study: Bauhaus University Weimar

The university campus is a knowledgescape, an expression of the spatial development around knowledge, an accumulation of social capital that unfolds in many forms of development. As creativity as a behavior is linked to knowledge creation and development, it validates the choice of the university campus as the case for investigating the relationship between physical space and creative behavior.

Every knowledgescape has its image attached to the specificity of local conditions and the Bauhaus University Weimar campus also has many unique factors that makes it a relevant study-case for understanding the creative behavior. Especially since this institution and the city of Weimar are characterised by the focus on creative industries, and its location configuring an inner-city campus embedded on the urban fabric.

5.1. BUW as a inner-city Campus, Knowledgescape and Creative Cluster

The Bauhaus-University Weimar (BUW) is located in Weimar, a city in the German state of Thuringia, with a population of around 65 thousand inhabitants (Statista, 2021). The small city has a strong cultural character related to its historical background for German history, with its Classical Period territory being part of the UNESCO World Heritage City programme. The classification by this such institution recalls the authenticity of the urban settlement as one of its main features (UNESCO, n.d.), an aspect that relates with previous research that relates authenticity as a feature of a creative city. Moreover, it is an urban setting with unique historical remarks, attracting a significant tourism market that impacts the city character and overall competitiveness mentioned even by Thuringian state investment program Freistaat Thüringen (2021). Such cultural background comes from significant historical periods such as the Weimar Republic, and notable past residents such as Schiller, Goethe,

Liszt, Nietzsche, Van der Velde and Gropius. The BUW currently has around 4000 students taking part in over 40 courses across four faculties: Architecture and Urbanism, Media, Art and Design and Civil Engineering. One of the main features of the university is that it has held since 1996 the name and the legacy of the historically well-known Bauhaus school founded by Walter Gropius in 1919. The educational institution has its early roots as Großherzoglich Hochschule (Grand Ducal Art School) in 1860, and since then passed through several political and physical modifications, changing administration and approach towards the revolving subjects of arts, crafts, architecture and ultimately engineering (Bauhaus University Weimar, 2021). The campus has its spatial configuration embedded in the urban fabric of the city of Weimar, an inner-city campus, with university faculty buildings concentrated on two main locations in the city, near Couldraystraße and

Marienstraße. The definition of the inner-city campus was reviewed by Magdaniel (2013) who stated that the urban setting of the university campus defines the physical relationships between the institution as a stakeholder and its hosting city. When applying the framework by Magdaniel (2013) see Fig.9, comparing the definitions by Hoeger (2007) Van den Berg and Russo (2004), the BUW campus in Weimar

would be a classical inner-city campus, with an Informal relationship with the city, which presents a have a higher chance for cultural exchange compared to other campus typology placed at city margin (Greenfield campuses).

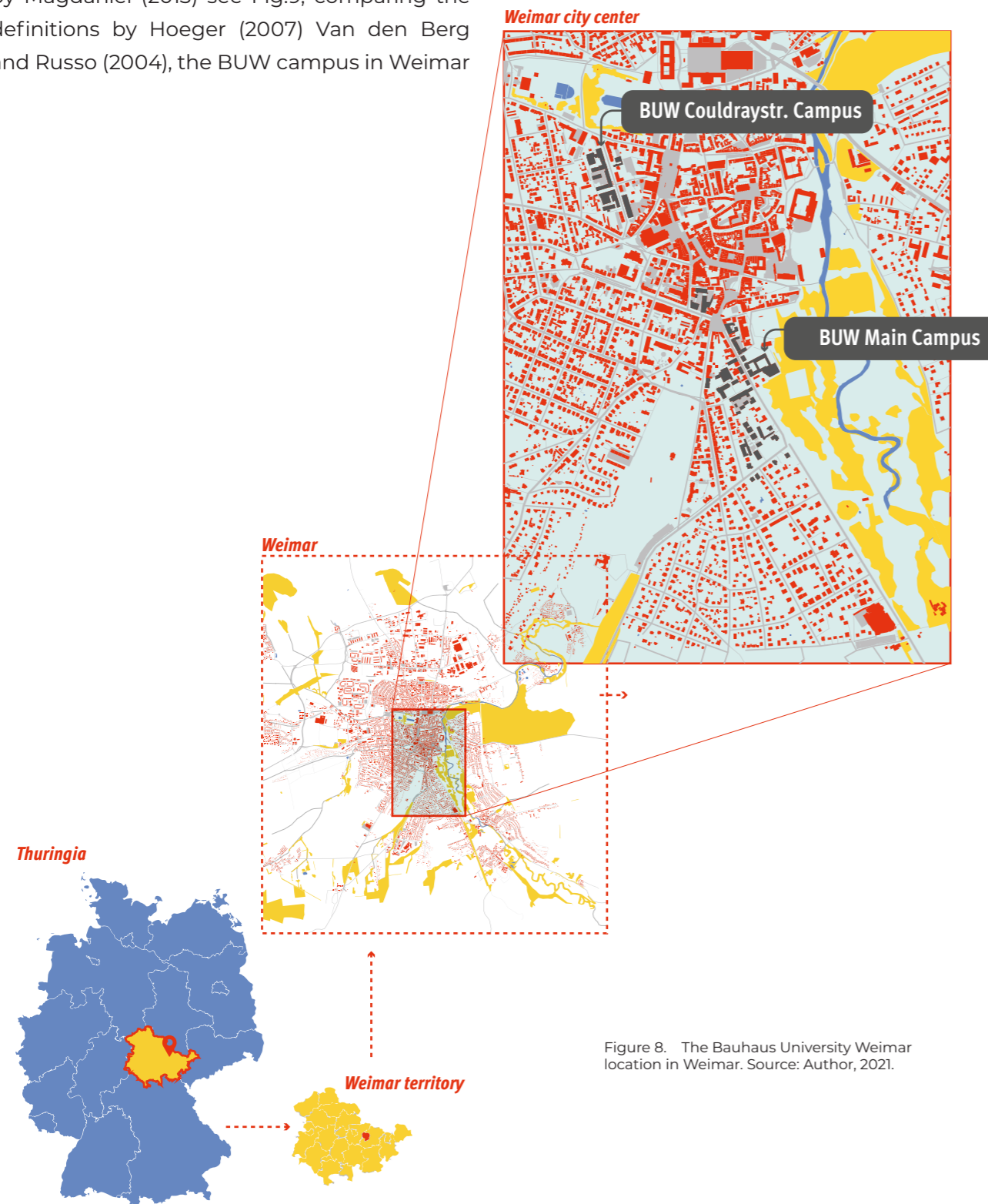


Figure 8. The Bauhaus University Weimar location in Weimar. Source: Author, 2021.

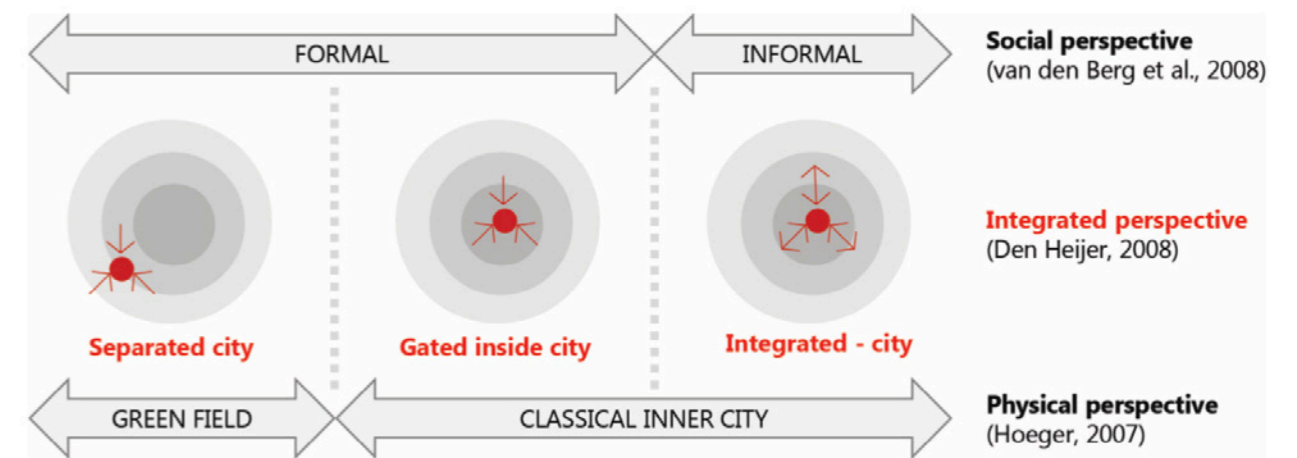


Figure 1. Connecting the different views on campus categories and their physical and social relationships with the city

Figure 9. Connecting campus categories and relationships with the city. Source: extracted from Magdaniel (2013), p.4.

The Bauhaus University as a knowledgescape can be related to the creative industry, with a strong potential of talent acquisition of the university which attracts a relatively international and diverse environment of students, with 27% of foreign members compared to 13,8% of the German national average (Puschatzki, n.d.). The concept of the creative industry is defined by researchers as “those industries which have their origin in individual creativity, skill and talent and which have a potential for wealth and job creation through the generation and exploitation of intellectual property”(Cunningham, 2002, p.4). Due to the creative industry-related knowledge, the campus areas are the setting for the interactions patterns between people, and there is an even increased relevance for the in-person interactions, as this industry “rely heavily on both buzz and face-to-face communication”(Asheim et al., 2005, p.3). In opposition to other fields related to analytic problem-solving or scientific knowledge, in which such significance of the interactions, especially face to face, would not be of the

same relevance (Asheim et al., 2005, p.3). Such phenomena would be a factor for differentiation between the image of place at the different locations of BUW, as the Couldraystr. location (mainly used by the Faculty of Civil Engineering) would be affected by concentrating more analytic-scientific disciplines in comparison to the Main Building location (mainly used by Faculties of Media, Engineering, Architecture and Urbanism, Art and Design). Such differentiation would also be related to the architectural features of the first being more recently built, and located farther from the inner-city centre.

The integration between the BUW campus and the city of Weimar can relate to the concept of “Creative Knowledge Ecosystem” by being an environment for knowledge exchange. Such a term can be explained as “Creative knowledge ecosystem refers to all the physical and organizational mechanisms of the creative environment which together form a self-sufficient entity” (Mengi et al. 2013, p.21). Therefore, the Bauhaus University by its

organizational structure can be placed in this definition, however, it is not fully self-sufficient as an isolated institution, but the ecosystem includes the integration of the educational sector of the university as a stakeholder to the city of Weimar's social and economic infrastructure, for example, affecting its housing, commercial and service dynamics that adapts to serve the university public. Magdaniel (2013) recalled such influence on the city characterizing the university "as real estate developers and agents of urban changes"(p.5).

The socioeconomic relationship between BUW and Weimar can be understood from existing research, which states for example, "universities are major players in many activities not traditionally associated with the ivory tower. They are employers, purchasers, engines of economic growth, innovators, cultural Mecca, branders of place and, increasingly, major real estate developers" (Sherry, 2005, p.11). In addition, the economic structures would support the traditional cultural works such as "designing, making, decorating and performing" to be associated with other service and creative industries, such as "advertising, design, fashion and moving image media" and such association would promote "new forms of commercial culture"(Mengi et al. 2013, p.21). Furthermore, "they all contain a set of knowledge-based activities producing tangible goods and intangible intellectual or artistic services with creative content, economic value and market objectives" (Mengi et al. 2013, p.21).

In the urban context, such economic dynamic towards the cultural and creative industries is visible in Weimar, with its image being highly associated with the cultural sector, heritage and long historical relationship with the higher education hubs, the Bauhaus University and

University of Music Franz Liszt. Beyond that, the cultural activities and historical background also form a touristic hub that potentialized the trade and real estate development, among other aspects, fact that dialogues with research that states "culture began to move much closer to the centre of policymaking as a potential economic resource, subsuming into the creative industries. In other words, creative industries now appear as an important indicator of the post-industrial new creative economy and serve as a considerable incubator for urban development" (Mengi et al., 2013, p.21).

Another concept that is related to the features of Bauhaus University Weimar's campus as a knowledgescape is clustering. This term was defined previously as "geographic concentrations of firms producing a particular product or service" (Porter,1998/2014), furthermore, "a geographically proximate group of inter-connected companies and associated institutions in a particular field, linked by commonalities and complementarities" (Porter, 2002, p.254).

Such clustering impacts on the interaction patterns, networks, and later on in the economic and social elements "clusters are seen as joint formal or informal cooperation spreading knowledge sharing through socio-spatial networks" (Mengi et al. 2013, p.25). Such clusters would demonstrate the relevance of aspects such as "spatiality, location, settings and inter-firm links, networks and connections in productivity, seen as being very central in the context of creative industries". Furthermore, the cluster "brings numerous benefits for both firms and the districts or regions in where they operate, and creates fostered competition higher productivity, new knowledge and creativity formation, increased job availability, innovation and urban growth"(Mengi et al. 2013, p.25).

The above dynamics of clustering and cultural-creative economy are evident in Weimar, through the city's publication "Business Location Weimar" published under the marketing motto "Historic. Innovative. Livable". It becomes evident the focus on such socioeconomic scenes, with one of the headlines strategically presenting Weimar as "Creative. Pioneering. Original" and "Clever minds", as the city advertises its current activities linked to creative economy: "An increasing number of companies are establishing themselves against the creative backdrop of Bauhaus University Weimar and the University of Music Franz Liszt Weimar. There is barely any other place in Germany where such importance is attached to the interdisciplinary, academic and artistic use of

different media. Outstanding networks make for a lively start-up scene – Weimar has a well-deserved reputation for being one of the leaders among Thuringia's larger cities when it comes to new companies started" (Weimar City Council, 2017).

Also there is an evident strategy on national and even global competition: "Looking at the creative and media-based economies as a whole – made up of architecture firms, advertising agencies, software developers, industrial designers, film production firms and more – Weimar is home to Germany's highest density of companies of this nature." (Weimar City Council, 2017).

Construction and related services	3
Industrial companies	5
Agents and representatives	3
Restaurants, accommodation	10
Finance/insurance	5
Transport	2
Wholesale	2
Retail	20
Services	49

WEIMAR INDUSTRY MAKE-UP
(by number of Chamber-registered companies in %)

Total companies: 3,939

Source: Erfurt Chamber of Commerce (IHK)

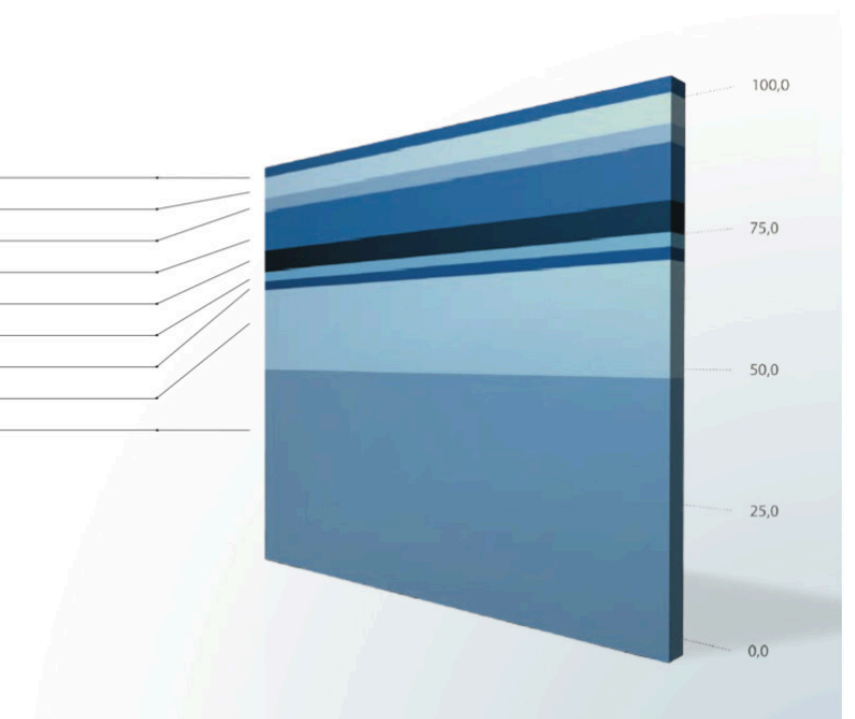


Figure 10. Weimar Industry Make-Up. Source: Weimar City Council, 2017.

City of Weimar facts and figures

SPOT ON IN MANY WAYS

- With an average age of 42.6, Weimar is the second-youngest city in the German state of Thuringia.
- Relative to its population, Weimar is home to the highest density of architects in all of Germany.
- Weimar is a UNESCO World Heritage Site, with no less than 16 recognised buildings.
- Weimar is home to Klassik Stiftung Weimar (Weimar Classics Foundation), Germany's second-largest cultural foundation.
- Weimar is a popular shoot location for film-makers and a renowned setting for cult German detective series Tatort.
- Tourism is booming – the consistently increasing number of overnight stays speaks for itself. Just under 3.9 million guests visit Weimar every year.

City of Weimar highlights

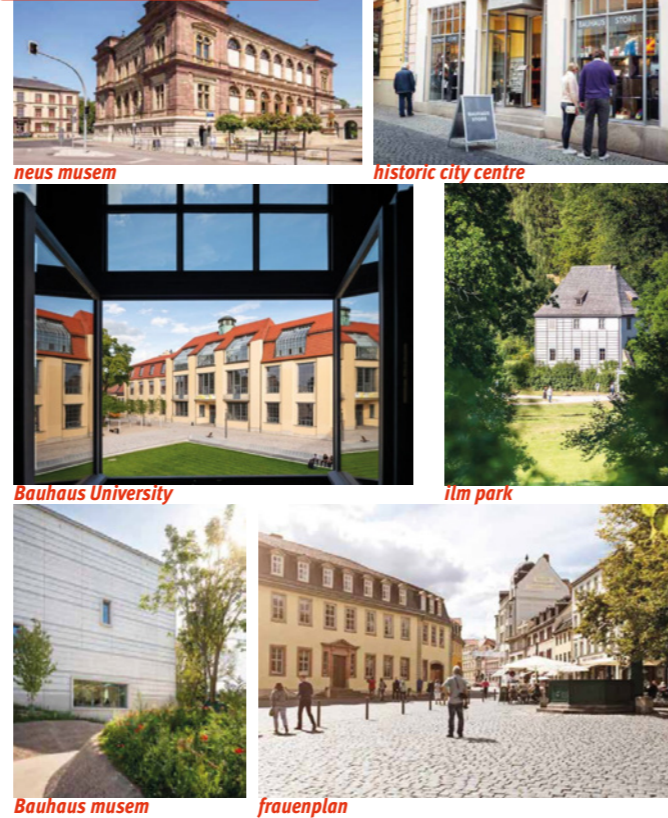


Figure 11. City of Weimar's highlights, facts and figures. Source: "Spot in many ways" text from Weimar City Council (2017). Images copyright from weimar GmbH (n.d.) and (2021), layout by author, 2021.

For the dynamics of the creative industries, researchers affirm that they "cluster to take advantage from the existence of a skilled human capital, creative class and the suitable (in terms of the demands of the firms and workers) land and physical environment. In such environments, existing human capital benefits from the face to face relations in terms of knowledge evolution. There is also a competitive base for them to develop, promote and transfer their knowledge, skills and innovations." (Mengi et al. 2013, p.25). The relationship between the university community, specially students, is not always to bring only socioeconomic benefits to the hosting city, and authors such as Van der Berg & Russo (2004) point out that such relationship also might inspire conflict. This scenario would emerge as a downside from the low economic

profile associated with students, who would use the urban infrastructure while having little tax contribution for the city. Moreover, the outflow of students after completion of studies would leave the city with no gain in terms of human capital (Felsenstein, 1995 cited in Van der Berg & Rosso, 2004). According to such factors, the inner-city campus of Weimar is not even further developed since the local socioeconomic market does not fully absorb graduates or potential, so the cluster relies instead on the flow of incoming and outgoing students. Meanwhile, one of the spatial gains of such target group would be attributed to the fact that students tend to appropriate and develop their spaces in the hosting city, which are later integrated by the host community, and even become driving forces for urban development (Pallares & Freixa,

2000 as cited in Van der Berg & Rosso, 2004). At BUW's inner-city campus in Weimar, the clustering is represented on the urban fabric, partially since the historical center concentrates gastronomy, services and amenities that target tourists (on the proximities of the open public spaces and landmarks) and such infrastructure is also used by BUW's public, becoming an another target group at this urban premises. Such dynamic relates with the research by Magdaniel (2013) "it is conferred the role of

the universities as cities within the city which addresses the relationship between university campus and city as a symbiotic relationship" (p.4). Also according to this author the expected development of the campus and the surrounding city become intertwined physically and socially, which would happen due to "from its ideological roots, has been related to its socio, cultural and economic urban context" (Magdaniel, 2013, p.4).

5.2. Student behavior: Questionnaire

As a strategy to understand creative behavior, the questionnaire is a tool chosen to perform empirical research, collecting quantitative and qualitative data, the information of where and why users would perform specific actions. The quantitative approach has the purpose of gathering individual answers and identifying overlapping choices, expressing the group behavior. To gain deeper insight on such data, the qualitative approach has the purpose of detailing the user choices.

Target Group, Methods and Sample

The students of the Bauhaus University Weimar were the target group to investigate the relationship between creative behaviour and physical affordances. This community represents the predominant users of campus open spaces and a driving force that has a strong impact on shaping and being influenced by the physical space. In addition, students are by definition on the path to acquiring, developing and dealing with knowledge, which is a condition to creative behaviour - the intention to develop new and useful ideas linked to creativity.

Furthermore, students at BUW are related to the creative industries by the context of the knowledgescape of BUW and Weimar explained in the previous chapter, which also is an impulse towards their creative behaviour.

The questionnaire had a combination of quantitative and qualitative questions, and it was performed according to standard considerations regarding the anonymity of the participants, especially during the data processing.

The tool for performing the questionnaire was

the Miro platform (Miro, 2021), that provided digital whiteboards in which participants could give input as text and placed dots in a already preset map, in addition, such tool allows for every participant to have a unique board, guaranteeing that one participant would not be able to visualize another's response, therefore not receiving external influence on their answer (see example of questionnaire on appendix and digital file of thesis).

First questions relate to the background of the user in case, asking "Which course and semester do you study", such questions provide profiling and statistic analysis of the group, getting an insight on their field background, furthermore, later if such group is more or less related to the creative industry, then being more or less self-aware of the creative behavior. The question on the semester of study relates to the time that the student has experienced the campus, which would differentiate a fresher from a senior student.

Moreover, considering the Corona pandemic, such a question is followed by another inquiring "Have you used the campus before/

after lockdown?”. Such profiling helps to differentiate students who had their campus experience more or less affected by the lockdowns and online study, or have memory of past conventional campus use, since this study was performed during a less strict period of social distancing regulations.

No further requirements in regard to the user profile were collected, for example in gender or age, since very seldom research had correlated creative behavior with such aspects, and the goal of the present study is to portrait the overall students' creative behavior.

The next question asked students “Think about your creative process, where do you normally have your best ideas, why you think so?”. Such questions seek to collect open answers, qualitative information about the student's understanding of the creative environment, not necessarily linked to the campus space. Furthermore, such questions also verify previous findings on the individual affordances for creative behavior.

The next step is to present a narrative question, simulating a situation where the creative behaviour (typical behaviour linked to creative following the hypothesis) would take place, investigating which open spaces of the university campus the students would choose for such scenario, besides, have a qualitative insight on their reasoning with the “Why did you mark these places” (later on to be compared to hypothesis). In addition restriction on the space choice, with the “campus open space” to avoid indoor answers.

Students had four maps, each map with a scenario, preceded by the introduction: “Please mark on each map (move and place the dots), the places for each question on the right side you can leave comments on your answer.”.

Such quantitative research is also a common tool of public participation, used broadly from PPS Project for Public Spaces(PPS, 2012) for correlating a group user and their spatial preferences.

Every narrative question was written to lead the participant to relate to a respective hypothesis, according to the diagram (Figure 12). The research process was dynamic and after the start of the research, the link between Hypothesis and Question D became ambiguous, since users might associate it more with leisure than space appropriation or experimentation (which was the goal), therefore, later on this question was excluded from further analysis.

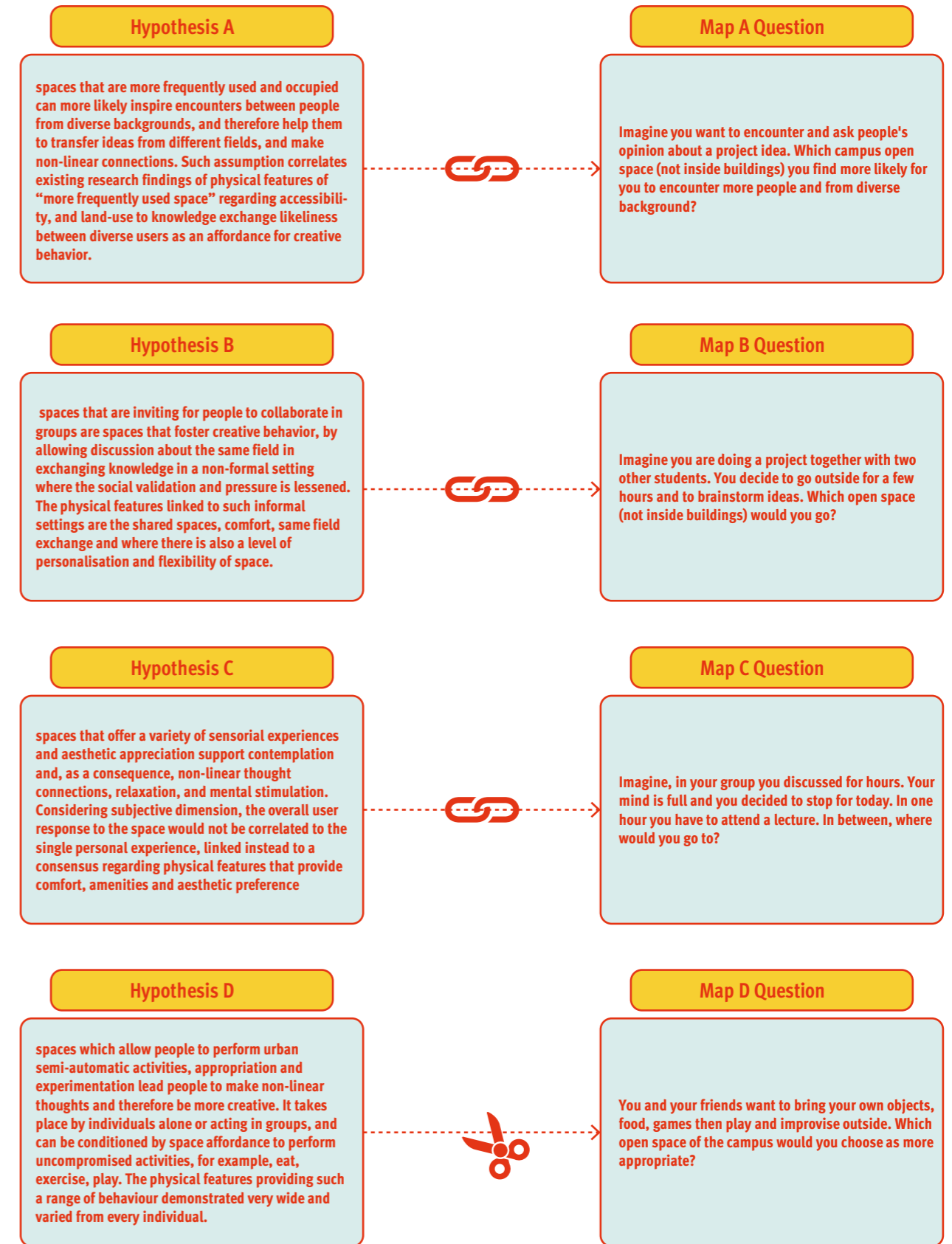


Figure 12. Correlation between research hypothesis and questionnaire narrative questions. Source: Author, 2021 except link and scissor icon from thenounproject, 2021.

Regarding the preset map, it was an advantage of the Miro whiteboard, since other digital survey platforms (such as KoBoToolbox) that use interactive maps, may lead the participant to mark locations outside the city, producing a deviation on the research framework.

The boundaries of the map were defined based on the walking distance, considering a walk of 5 minutes, departing from key locations of BUW's, the Library and the Main Building, and such distance was calculated using the webapp TimeTravel (TimeTravel, 2021).

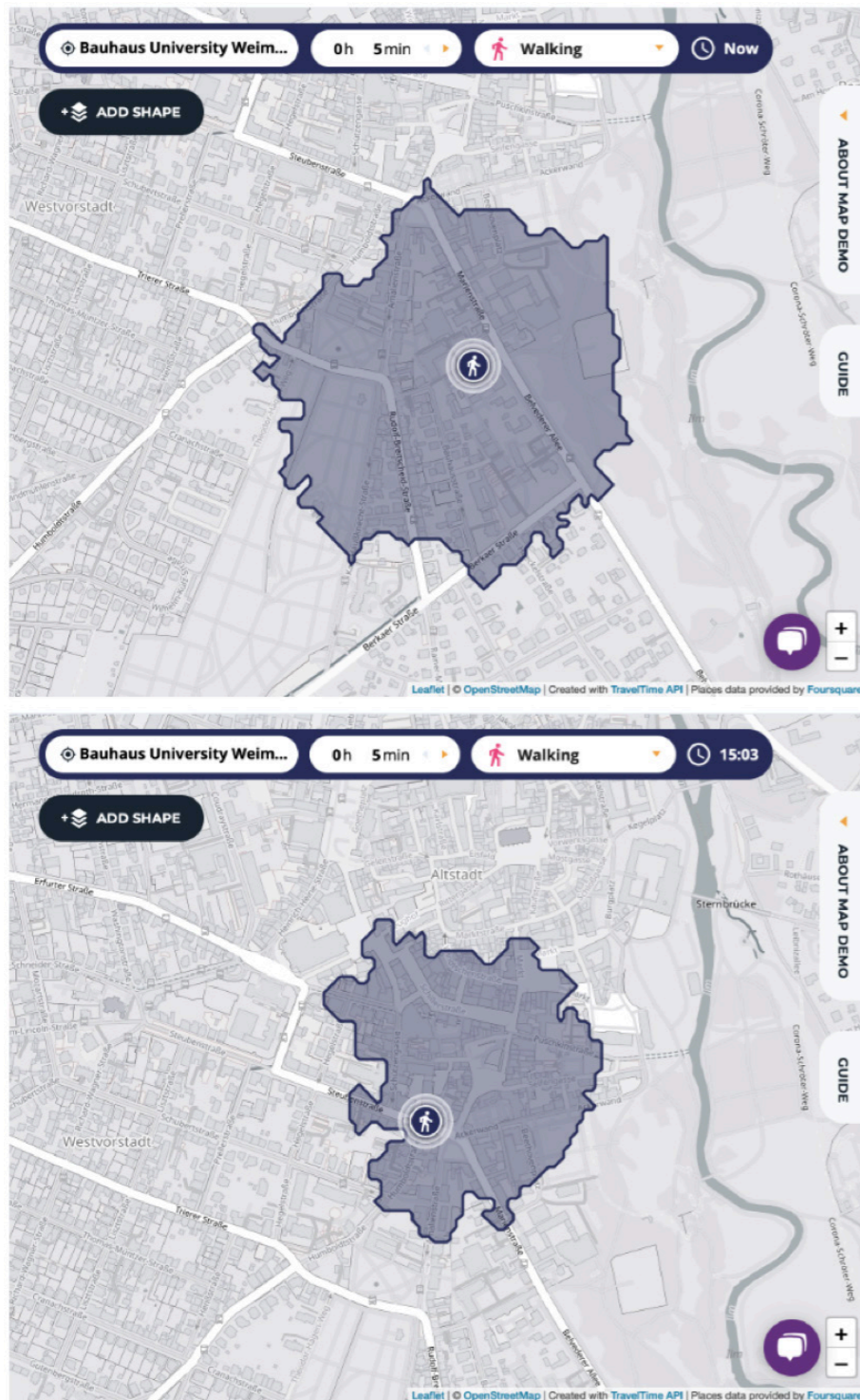


Figure 13. Walking distance boundary on 5 minutes from main locations at BUW Campus. Source: Travel Time Map website, base map Openstreetmap, 2021.

Another aspect for defining the base map was whether to highlight the BUW's property spaces or leave the border of which places belong to the campus to the conception of the students. Such an open approach was applied to a pilot version (Figure 14) of the questionnaire applied to four students randomly at the campus on 20.07.2021. During such a test, it was noticed that some students presented difficulties to locate in the map the key spaces of their choice, detectable since their text

references did not match the map location. As a consequence, even that assigning key locations on the map might have an influence on the choice of students, such guidance was included to give participants basic referencing: highlighting university buildings in different colors, with numbers on the Main Building, temporary cafeteria (Mensa) and Library, in addition to nearby public spaces and street names (Figure 16).



Figure 14. Students participation on pilot version of questionnaire, unmatching response between place's description and mark on the map.

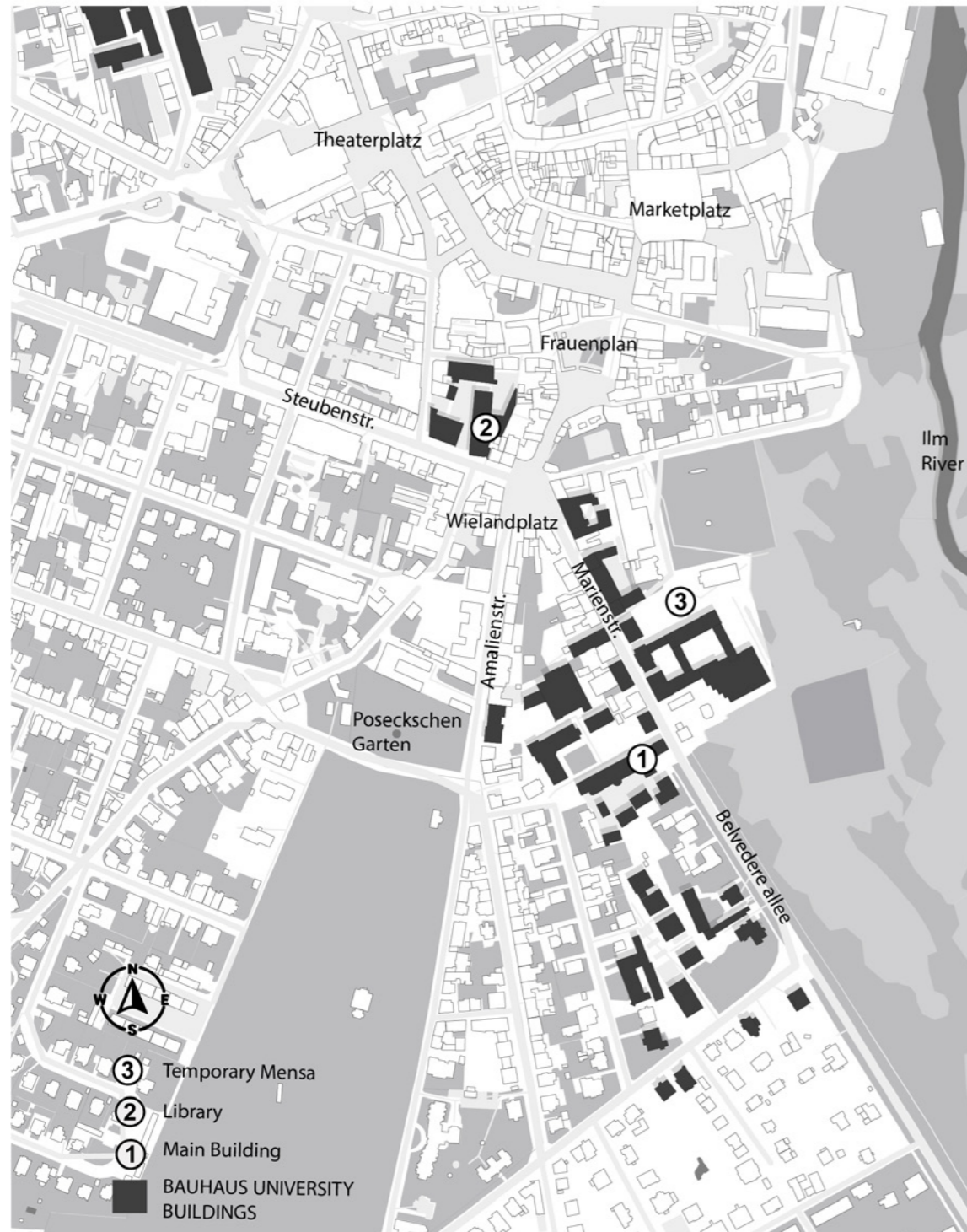


Figure 16. Question Map, with key locations and guidance. Source: Author, 2021. all maps had base from <https://schwarzplan.eu/en/figure-ground-plan-site-plan-weimar/> edited and developed by author.

The method for gathering volunteers willing to share their experience was to invite them directly and collect contact data (the name and email address), explaining the goals and process of the questionnaire. In total there were 154 students willing to participate and in total 83 effectively took part in the research, representing 2.07% of Bauhaus University Weimar's student population.

Regarding the data processing, every questionnaire had the participant's name, for sharing the personal links and if necessary consultation, however, for general handling every questionnaire was later attributed to a reference number.

After receiving answered questionnaires, all collected data was transferred to both a spreadsheet for generating statistical data (Google Sheets, verify digital file attached to Thesis), and a file on the software Rhino, with special detail on the dots transfer to specified points location on Weimar's map, specifying on the Attributes User Text for every dot: the questionnaire reference number, whether the student had studied before or after lockdown, course and semester of study, rough location, reason of location and which Map question it refers to (Figure 17). Such classification was used to later better handling and statistical data processing on Rhino's application Grasshopper.

Key	Value
Studied Before Lockdown	YES
Studied After lockdown	YES
Reason for location	Ilmpark, distance from the university atmosphere.
Rough Location	Ilm Park
Map Reference	B
Study Program	Architektur MSc
Questionnaire Reference Num	21
Semester	2

Figure 17. User dot transferred to point geometry in Rhino, detail in file configuration Attributes User Text, example of questionnaire (Ref. Nr. 21). Source: Author, 2021.

Also, to process the results from the Question Maps, the main analysis comes from the visual comparison between areas with a higher or lower concentration of points. From the 84 questionnaires in total 733 points were collected (564 for maps A, B and C; and 169 Map D (not further taken in calculation)). With such an amount of overlapping points, the visualization on the map is not clear, a limitation tackled by a Grasshopper algorithm.

To visualize the concentration of points, the logic was to classify points which were the least to the longest distance to the other points, under a fixed radius, then expressing such range by

coloring the most concentrated points and least concentrated points. In this way, the most voted places become more visible. This was possible by connecting the point's geometry to the "Proximity 2d" component in Grasshopper, it searches for two-dimensional proximity within a point list, considering a maximum radius, with one of the outputs being a list of segments between such connections. Then this list was decomposed into its domain and used the range to color the gradient preview, from more (Red = more connections to other points) to (Blue = isolated points).

Limitations and Considerations on Data processing

During the performance and data processing of the questionnaire results, several unforeseen limitations were noticed. Such limitations did not disqualify the questionnaire results but shed light on the user-centered research challenges.

One of the expected conflicts was the intended flexible understanding of the “university campus open space.” The BUW’s campus is embedded in the urban fabric, with the property image associated with the scattered buildings; it was expected that some participants would have a diverse understanding of which open spaces would belong to the university campus. As a result, many students referred to the open public spaces of Weimar as spaces belonging to the campus, while others linked “campus open spaces” strictly to spaces immediately near the university buildings.

Another expected limitation was how the participant’s self understanding of a more or less creative individual would affect their ability to describe their creative process. Some students described their field of study

according to the stereotype of the more and less associated creative behavior, although their answers still relate to psychological affordances. Some individuals shared to reflect on their own creative process, as the following statement fragments:

“I do Engineering, we don’t have such a creative focus, but for me the library is the best location, I like organization to be able to work and being in the library I can really disconnect the world and focus so much.” Participant answer to question 3, Questionnaire Ref.Nr. 41.

Another limitation was the scale of the map and the size of the dots. With the goal to keep a user-friendly experience of the questionnaire, the size of the dots was defined to provide easier click and drag function, and less zooming. Such choice meant less precision on the definition of the point location, especially when compared to the Rhino file used for the data processing.

This fact impacted specially on the data processing of the Main Building and M18 square. This is one of the institutional open spaces of

the campus, and due to its size and different spatial features, the expected statistical analysis would separate it into three different zones: the M18, Main building and Green lawn.

However, the separation between such spaces was not precisely visible at the map scale or user experience. In addition, some students refer to the M18 square in their text, while placing the dot at the Main Building square, generating conflicting results between the quantitative and qualitative aspect of their participation. The solution to such limitation was for the statistical analysis merge the two spaces, and consider the qualitative description to define whether the student was referring to one or the other when considering the particular features of each place.

In addition, for cases where the participant placed the dot “on the border” of the spaces, the dot location was processed according to the qualitative description (where the student explained their choice), in cases where conflict was not solved the dot was discarded.

Another conflict was regarding senior students, who experienced the spaces behind the older Cafeteria (Mensa) and pointed these spaces as the most relevant and students who market the same space as their Ilm Park preference.

This university facility is closed for the prior three semesters, so newer students had not the chance to experience it or the researcher to properly investigate. Still, when students place dots on this space and refer it in text to “old-mensa” their dot has had their rough location attributed to Old Mensa, and if students refer to it relating to the Ilm Park, their answer was attributed to the park. In this case, the memory of the student counts on the qualitative description of the appreciated space features either relating to the university facility or the park.

Another criteria for transferring the dots to

points were the following: some participants still placed dots inside buildings, and since such information does not relate to the goal of the research, such dots were discarded.

Participants also refer to places in description but did not place any dot, in this case their answer was assigned to the center of the mentioned place if specific enough, otherwise the answer was also discarded. Dots which participants placed exactly in between the edge of buildings and open space were assigned to the immediate open space. Fortunately for the research precision such measures were not largely applied.

Covid-19 Pandemic and Student Experience

The academic years between 2020 and 2021 have been strongly affected by the Covid-19 Pandemic. As essentially a place for gathering and exchange, the educational spaces were soon one of the institutions to be closed. Under the new social-distancing measures, teaching and learning needed to adapt to the restrictions through online and self-learning.

While such conditions provided a strong incentive for technological and social development on online education methods, it also meant a challenge on how the interactions would happen among employees, teaching staff and students. Considering the situation of the Pandemic, the limitations brought by social distancing and online teaching would impact the processes and outcomes of knowledge based activities, which are intrinsically related, if not dependent, to exchange and interaction. As a consequence this scenario affects one of

the main affordances for creative behaviour, face-to-face interactions.

This research focuses on getting an insight on the creative behavior at campus space, and the target group at Bauhaus University Weimar was directly affected by such a situation, with many students studying from their different locations at hometowns, home countries and even rooms in Weimar - in any case - not using the campus space. However, after several changes in the social distancing measures, some students had access to workshops, ateliers, cafes and university buildings in different contexts, allowing this research. Moreover, students who started their courses before the pandemic also had relevant experience to share. Another remark on this background is that the after pandemic scenario affected the individual experience of the campus space and the collective experience, since students who still used the space also encountered a space with less students and different dynamics.

So even considering that there is a question specifying whether the student had experienced the campus before/after lockdown, it is assumed that a student who started their studies after the Summer Semester 2020 was already affected by the lockdowns (being for this research in the 3rd semester). For statistical calculations, such semester relation was considered less important than student's self-assessment of campus experience, since there were students who are in early semesters in a given course, but had already finished another course in the previous years, having then long time campus experience. Note: for statistics the students who answered the question with simply "yes", it was attributed to both before and after.

When comparing answers in dots placements

for questions A, B and C for the extreme groups, participants who studied only before or only after the lockdown, it is possible to notice a few changes in the place preference of such groups with regard to the creative behavior. (figures 18 and 19).

Even considering that the sample of students who studied only after lockdown is double of the only before, students who studied exclusively after lockdown chose spaces more outside the campus, and had more scattered placements than students who studied only before. Such findings demonstrate that the new students might be more likely to use spaces of Weimar than the BUW's campus. Such phenomena might be related to the fact that these students were less socially conditioned to use the campus due to the social distancing factors, and less integration to the social environment of the campus.

For further calculation, the answers from above mentioned extreme groups were calculated together with the other answers, since such extremes were balanced by the group of students who studied both before and after (67,5% of students).



Figure 18. Points - students who used campus only before lockdown. Source: Author, 2021.

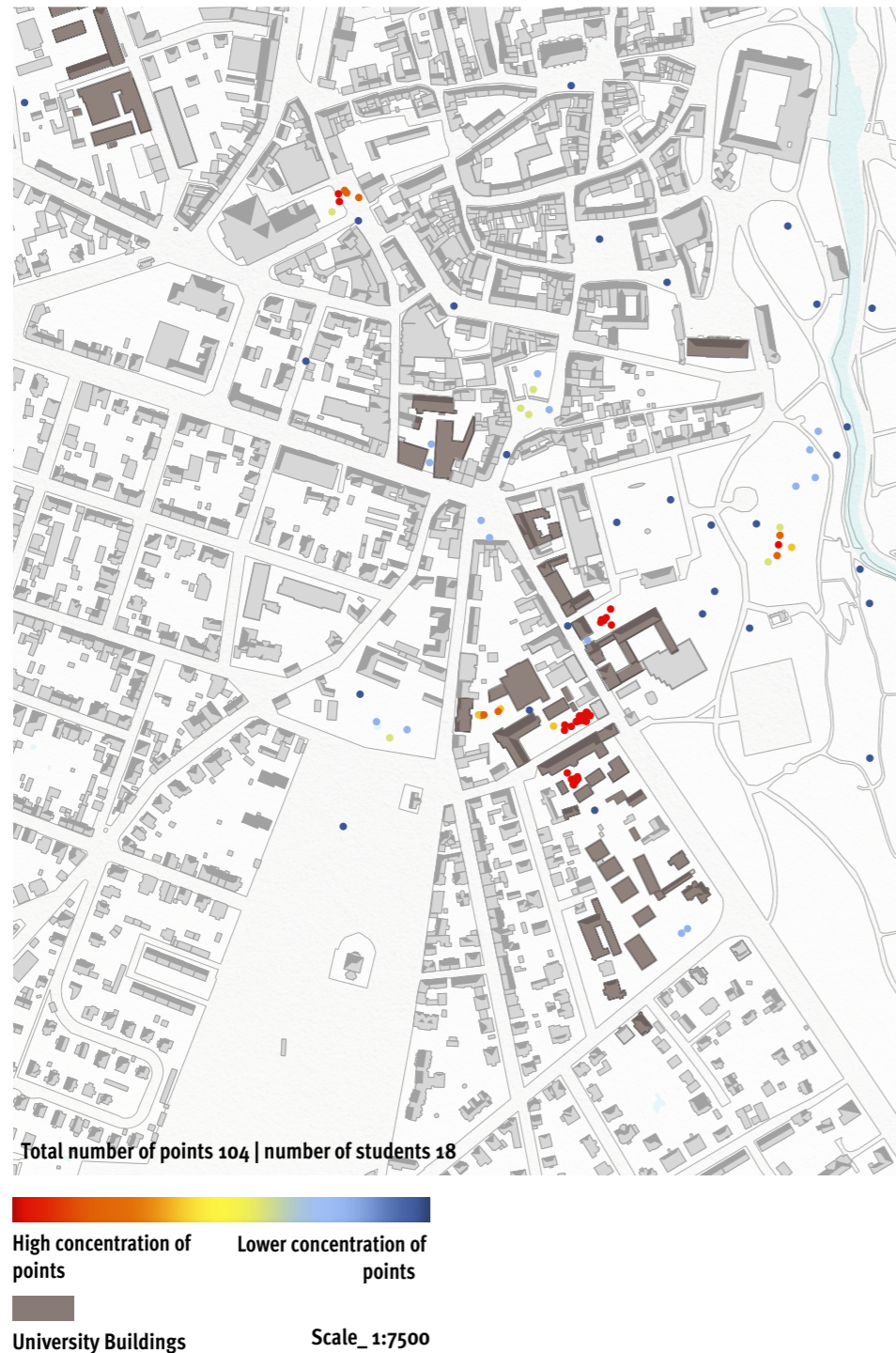


Figure 19. Points - students who used campus after lockdown. Source: Author,2021.

User Profile

The participants of the research were 83 students of the Bauhaus University Weimar. The group also includes a few students who had freshly graduated since the questionnaire was performed at the end of the semester. Regarding the background, they were from 17 different courses in PhD, MSc and BSc levels, mostly from the creative industry background, with only 13% of students from the Civil Engineering Faculty. (Figures 20 and 21)

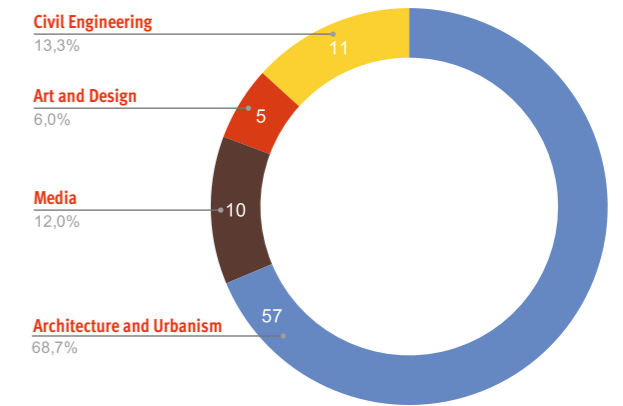


Figure 21. Chart on students participation according to course faculty. Source: Author,2021

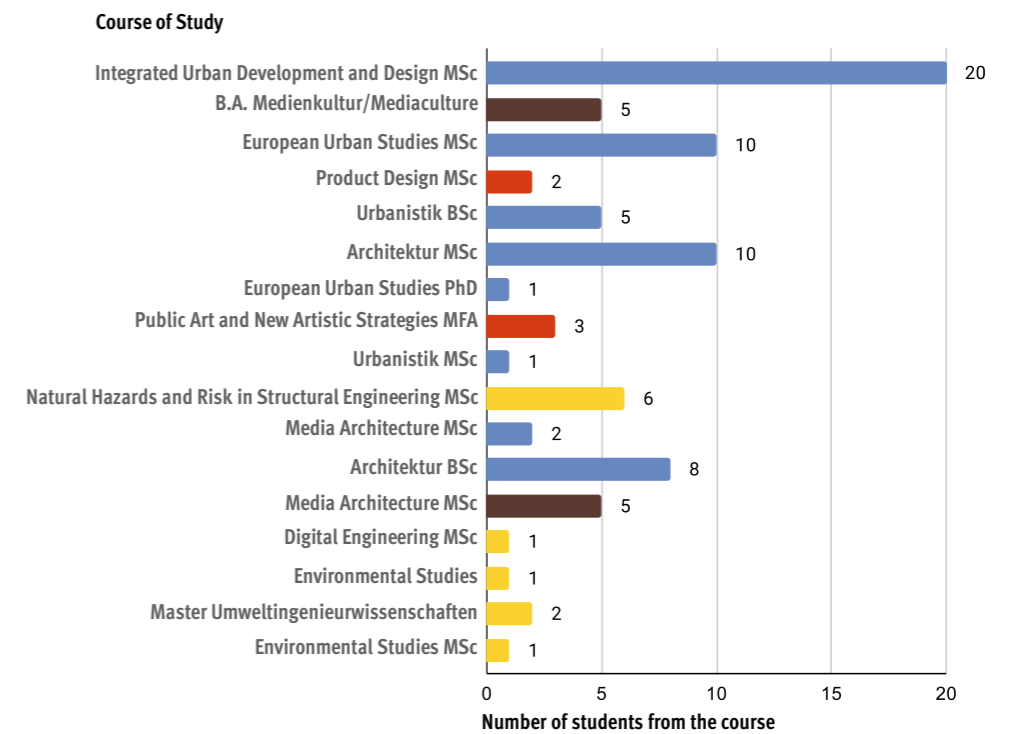


Figure 20. Bar chart on students participation according to course of study. Source: Author, 2021.

From this sample, the predominant type of user (56 people) were students who have studied both before and after lockdown (see figure 22). This group has longer experience with the campus, therefore being acquainted with the space and the city of Weimar.

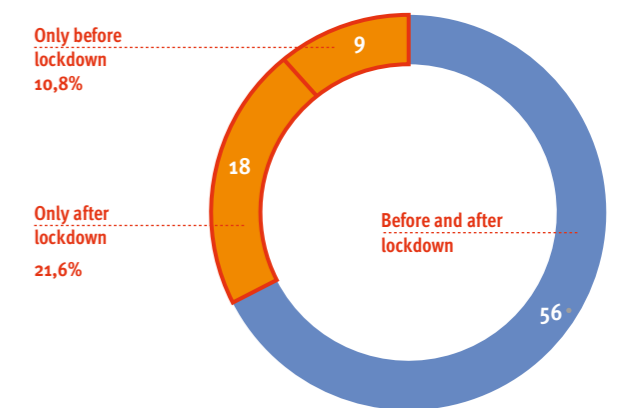


Figure 22. Students' reply categorized by their use of campus related to the pandemic. Source: Author, 2021.

Qualitative aspects of student's creative spaces

For the following step of the research, the question for the participants was "Think about your creative process, where do you normally have your best ideas, why you think so?". From the 83 answered questionnaires, in only 5 of them, the participants left the question blank or didn't understand, keeping the data set consistent. This was a planned open question and in the narrative question the interrogative adverb "where" was intended to lead the student to link their creative behaviour to physical space.

In their answers, however, some students presented rather different interpretations of the expected link to space. Possibly such results are associated with the subjective reasoning of students when reflecting on their own creative process.

One of the findings is that some students are more aware of their creative process than others, presenting different levels of precision on their answers, for example, in the following fragments:

"Just before going to bed- because I am relaxing and entering a more open mind space,let controlled [!] by my conscious limitations. In discussion with other[!] - it also opens your horizons and formulation of thought process is multiplied." (Participant of questionnaire Ref.Nr. 43).

"In the shower (alpha state), sleeping (I dream about my work) and talking to friends in a cafe (e.g. M18)"(Participant of questionnaire Ref.Nr. 44).

"i don't know, anywhere"(Participant of questionnaire Ref.Nr. 71).

In addition, as mentioned, not all students associated "where" directly with the physical space, associating it instead with other affordances for creative behaviour, which could be identified as coming from aspects such as actions (what one would do to reach the creative outcome), feelings (what one would feel to reach the creative outcome), places (where one would reach the creative outcome) and social (one would reach the creative outcome by relating to other individuals). To get a statistical overview of the answers, the student's answers were associated with respective keywords and then these keywords were analyzed in frequency, as can be observed in figure 23. Furthermore, also the proportion of keywords which were associated with either actions, feelings, places or social aspects can be observed on figure 24.

According to such classification the most voted affordances for reaching a creative outcome would be shared buildings (the sum of references to coffee places, green house, atelier, library, mensa, M18, workspace, count 33) then equally the domestic environment (the sum of references to home, toilet, shower and bed, 31 counts) and social affordances (the sum of references to being surrounded and interacting with others 31), followed by open spaces (Nature, outdoors, Ilm park, open environment, campus, Main building space, park, count 27).

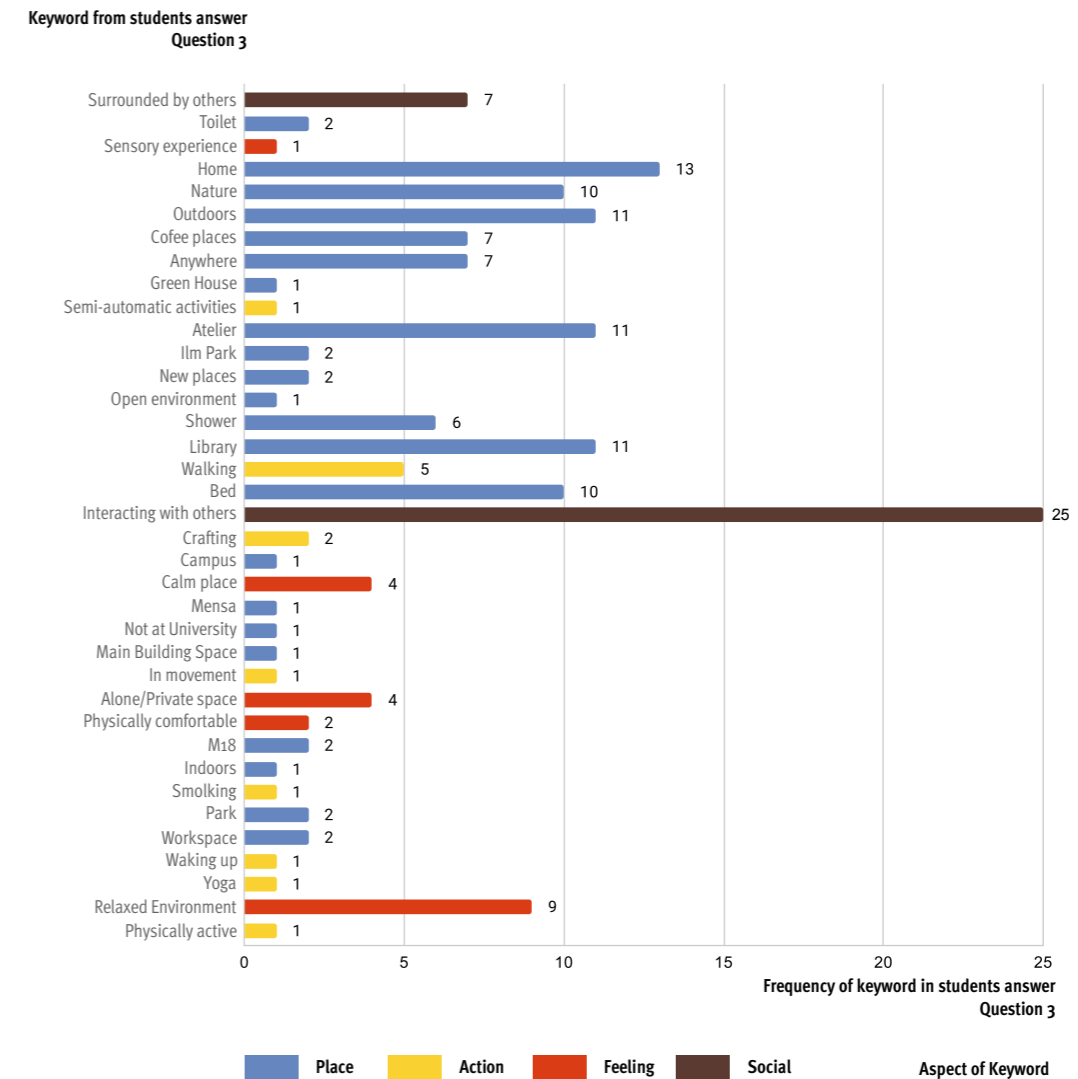


Figure 23. Frequency of keywords from students' answers to question 3. Source: Author, 2021.

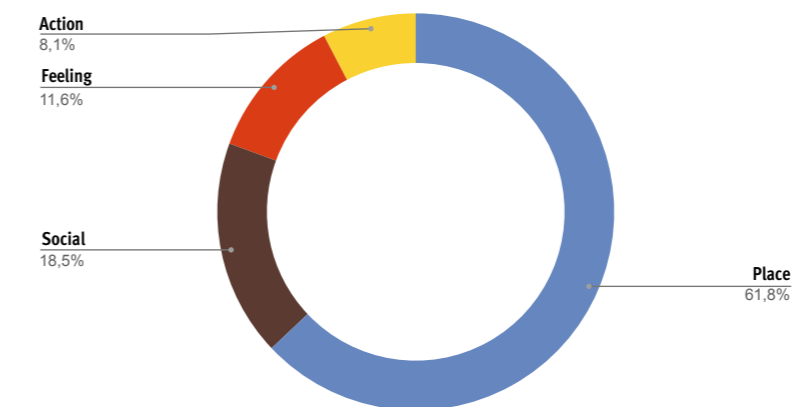


Figure 24. Proportion of affordances associated with keywords from students' answers to question 3. Source: Author, 2021.

There was a pattern observed on the student's answer structure, that they would list one or more of the above factors (action, feeling, place, and social) interacting with each other and creating opportunities to feel or behave in a certain way that would lead them to their "best idea". What recalls to the hypothesis framework of the physical and psychological affordances informing the creative behavior, and ultimately the creative outcome.

For this section, the research focus relies on the answers which referred directly to places as main reasons for reaching a creative outcome. However, there remains a potential for further analysis that could be performed on the qualitative aspects of the answers which mentioned firstly actions, feelings, and social aspects as main affordances for creative outcome for example in the following statement:

"I think it does not depend on place, but more on people I am working with and on discussions that we have. But if I have to choose the place, I would say home where nothing distracts you." (Participant of questionnaire Ref.Nr. 8).

Students presented varied levels of detail when describing place as affordance for their creative experience, and some of the more insightful are the following:

"Interesting question! I feel the most creative in spaces with a lot of greenery, fresh air, natural sounds (not noisy) and natural light. In those kind of spaces I feel calm, so I can focus better on my thoughts[!]. Also, I believe to be more creative when I can move freely, or where I can find many sitting options (on the floor, on the bench, lean on the couch, on the chair...). Furthermore, [!] I find contact with other people very helpful[!] to boost creativity, because sometimes just telling somebody about my

project makes it more clear to me." (Participant of questionnaire Ref.Nr. 7).

"Usually when I'm on my way to somewhere or at new places, for example when I am inside a museum where I've never been to. I guess it is because our brain starts to look for new patterns and features around us when we are moving or entering an unknown place, and this process stimulates creative thinking." (Participant of questionnaire Ref.Nr. 25).

"My best ideas happen in different places, but precisely in those spaces that are open and with a relax environment. Particularly, in our city, some of those spaces for me would be: M18 (plaza), wielandplatz, and Ilm Park." (Participant of questionnaire Ref.Nr. 31).

"I, personally, am the most creative when I am around nature. I feel the most create [!] when I am traveling, have some quietness around me and peace. This could also be a place in the city, but either with some nice view or a bit set back - to have this peacefulness." (Participant of questionnaire Ref.Nr. 48).

"at the library, the public space in front of M18 in summer. The library provides many working spaces and working atmosphere to concentrate. M18 has a cheap coffee and nice court yard [!] with movable furniture which allows to arrange space depending on the need of the working group."(Participant of questionnaire Ref.Nr. 57)

In the next phase of analysing Question 3, it was examined only the answers in which the student gave more than description, thus giving arguments in detail for their association between space and creative outcome (a total 27 answers).

In such a sample, it was noticed that students reported place as an affordance for actions and/or feelings that led them to creative outcome, and such interaction could be traced in three different patterns. The interactions occurred by place conditioning directly either feelings or actions, or place conditioning first actions and then feelings, as Figure 25, which shows the proportion of answers in which the students reported each type of interaction.

In a closer investigation, it was found that the feelings and actions afforded by a place described by students were similar to concepts previously mentioned by the literature review. Considering the interaction of place as affordance for actions, the actions could be classified as performed by an individual, in a group, or both, as can be observed on Figure 26.

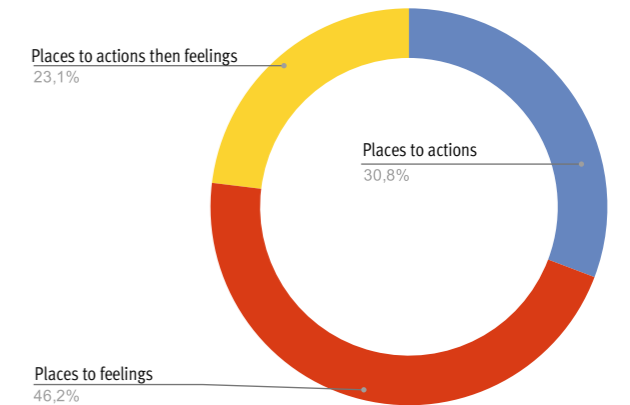


Figure 25. Proportion of interaction patterns between places as an affordance for actions or feelings for reaching the creative outcome, according to the student's answers. Source: Author, 2021.

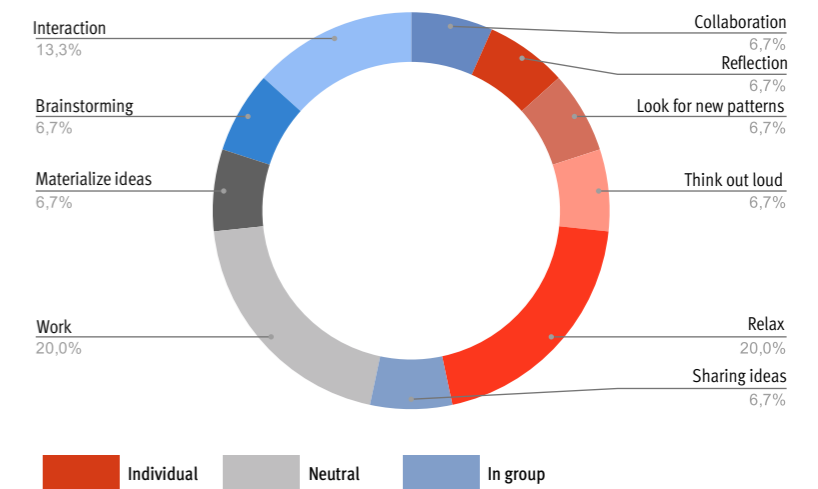


Figure 26. Proportion and type of actions afforded by place, according to the student's answers. Source: Author, 2021.

Regarding place as affordance for feelings, such feelings were, as described by students: relaxed, inspired, happy/creative, peacefulness[!], open mind, free mind [!], comfort, concentration and focus, with the last two feelings being the most cited (dark blue/orange in figure 27).

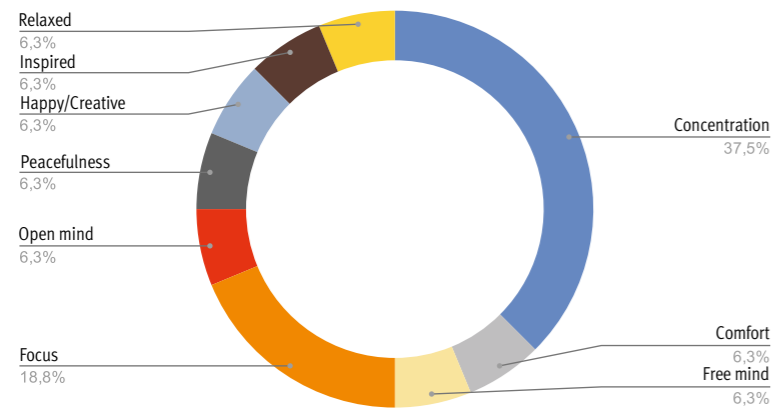


Figure 27. Proportion and type of feelings promoted by place, according to the student's answer. Source: Author, 2021.

A further finding of this section of the questionnaire was the similar answer between participants of different fields, Arts and Engineering, challenging the assumption that a less and more analytical background would lead to different affordances for the creative outcome. For example, how the following answers both students related to the "workspace":

"I have my best ideas in my "work station". I really need to feel physically comfortable: good chair, good table, better with a good screen resolution, good light. It has been almost always my desk at home, but when I worked as engineer [!], it was at my work. I think that as I am physically comfortable, then the thoughts flow easily." (Participant of questionnaire Ref. Nr. 42, student of Natural Hazards and Risk in Structural Engineering MSc).

"In a proper work environment (studio, workshop), because you are materializing the ideas. But also spontaneously while walking happens sometimes, because I am taking a distance from the process." (Participant of questionnaire Ref.Nr. 47, student of Public Art and New Artistic Strategies MFA).

From the students' experience evaluated in this chapter, it was detected that users perceived

a relationship and attributed their creative outcome, in this case their "best ideas", to an influence of physical space and how it afforded conditions for their creative behavior. However, even a place having a strong influence is higher than other aspects such as social and psychological conditions. And even such association might be related to the nature of the narrative question, which asked about a spatial condition.

Map A - Frequent and diverse interactions

The next question of the questionnaire (4A) was related to hypothesis A (refer to Chapter 3, p.47), and inquired the students their favorite locations which supported diverse and frequent encounters with other people, by asking them to mark on the provided map.

The question was "Imagine you want to encounter and ask people's opinion about a project idea. Which campus open space (not inside buildings) you find more likely for you to encounter more people and from diverse background?" followed by a box where they could give notes explaining their choice, stating "Why did you mark these places?".

From the 83 questionnaires, only one of them had to be discarded, leaving a sample of 82 answers, which provided 187 dots, later overlapped as it can be seen on figure 28.

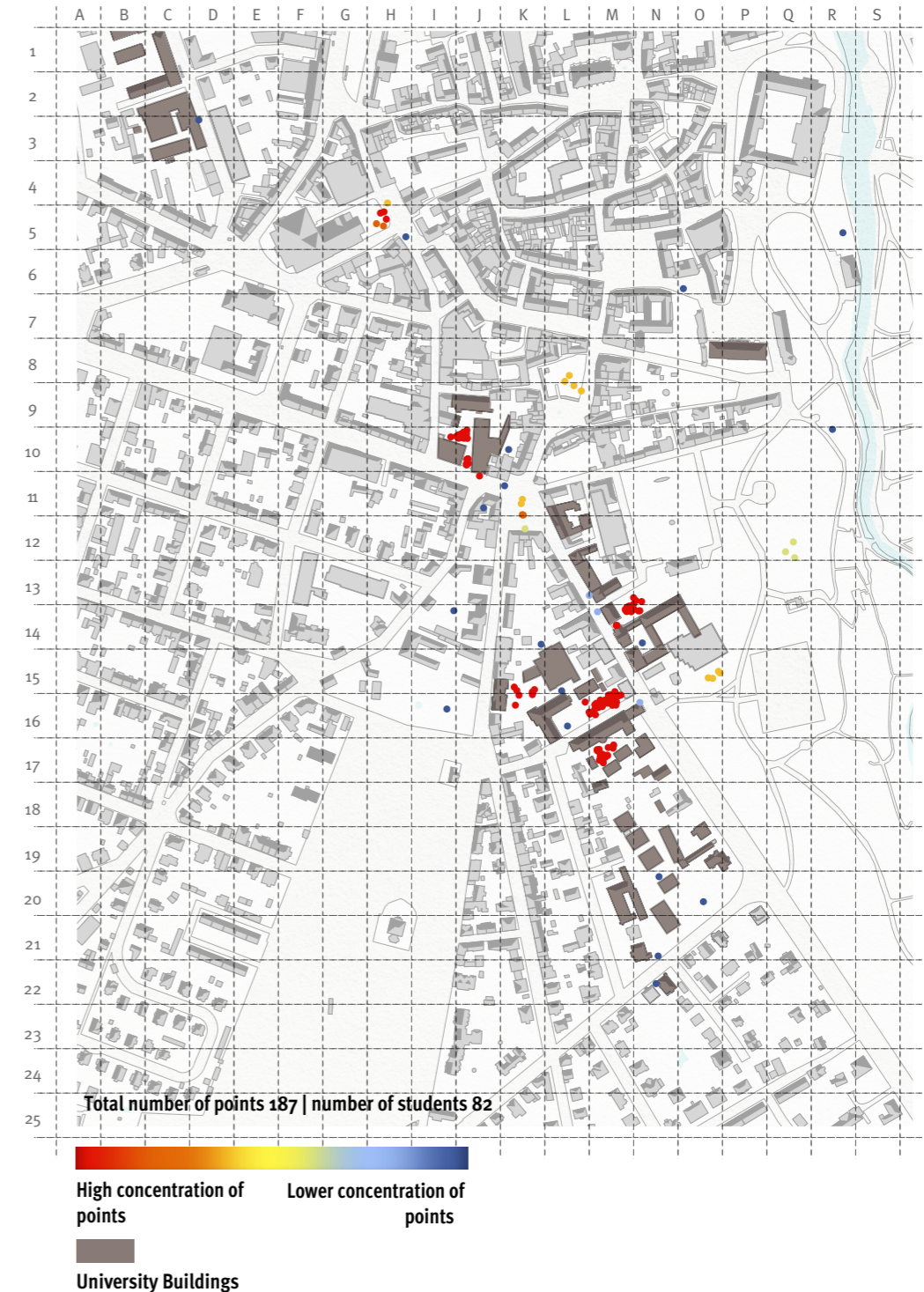


Figure 28. Students' answer for question 4A, regarding diverse and frequent encounters. Source: Author, 2021.

By analysing the overlapping answers, (figure 28), it is possible to visualize places which were more frequently chosen by the participants, which were statistically distributed according to figure 29. In this chart (marked in yellow on figure 29), it is possible to notice that the large majority of spaces were associated with the campus space, which was expected by the nature of the question.

Nevertheless, students still chose places in Weimar, which demonstrate a level of integration between city and campus, especially at Theaterplatz (Grid cell H5, Fig. 28), Ilm Park (right side of map Fig. x4), Wielandplatz (Grid cell K11 and K12, Fig. 28) and Frauenplan (Grid cell L8 and L8, Fig. 28), which surrounds BUW campus.

Furthermore, some students made comparison about their choice between spaces of Weimar and the campus, for example:

“In M18 there are always people from every BUW faculty. Also by standing in front of the library it’s possible to interact with people entering, leaving and having breaks. Theater platz is both a place of passage and to sit for a beer or food: here it’s possible to also meet people from the Musik Hochschule.” (Participant of questionnaire Ref.Nr. 46)

Students also presented argument for choosing public spaces belonging to the city, as the following:

“at these two public spaces is no consume pressure and different people are coming together with different backgrounds (I guess) and there are different uses of the space,

especially at Theaterplatz”(Participant of questionnaire Ref.Nr. 28, in reference to Theaterplatz and Frauenplan).

“Wieland might have student population as well as people from other backgrounds as its close to uni, housing, stores, etc.”(Participant of questionnaire Ref.Nr. 33, in reference to Wielandplatz and Theaterplatz).

With regard to Bauhaus University Weimar, the main chosen campus open space was by far the M18 Square, followed by the Library square (grid cell J9 and J10, Fig. 28), open space Mensa (around grid cells N13 and M14, Fig. 28), cafe atelier (grid cell L17, Fig. 28) and Main building square - with these last four spaces having a similar a level of choice.

If analysing the spatial condition, M18 and Main building squares are in the same area of the campus (grid cells L16 and M16 of Figure 28) and where for further analysis combined. Statistically, M18 and Main building squares together have more than double the amount of choices compared to the next three most chosen spaces combined (M18 plus Main Building, 69 references, while Library square plus cafe atelier and open space mensa, 65 references).

Since every student marked from one to three location points, and provided varied levels of qualitative description for their choices, it is possible to evaluate which spaces were perceived by the students as the most diverse and frequently used. In addition, it can be retrieved from their qualitative answers both, the general reasons for their choice, as well as comments for specific choices. For the qualitative aspects the data set was composed of 69 answers, since 13 participants left this field blank.

From the qualitative aspect of the question, the definition of what is “diverse” of “frequent” might have different interpretations from one user to the other. However, the goal of the question is not to address their perceptions of diversity of frequency, but which spaces they perceive as affording these aspects regardless of its perceived specificities.

The next phase of the analysis focused on the qualitative aspects of why a student would evaluate a place as more likely to provide diverse encounters. From the previous quantitative sample of 82 participants, only 69 of them provided details on the reason for their choice, and from those, 68 students referred to at least one of the most appointed spaces (M18 and Main building square or Library square, open space mensa and cafe atelier square).

After associating their answers with keywords, it was possible to perform statistical analysis of which features were more commonly appointed by the students, then classified according to physical, social or psychological affordance, later observing how students would attribute the different impacts on their user perception of a space that provides a high frequency of diverse encounters. Such analysis can be visualized in the following graph (Figure 30), which compares the features mentioned by students when electing the five most chosen campus spaces combined.

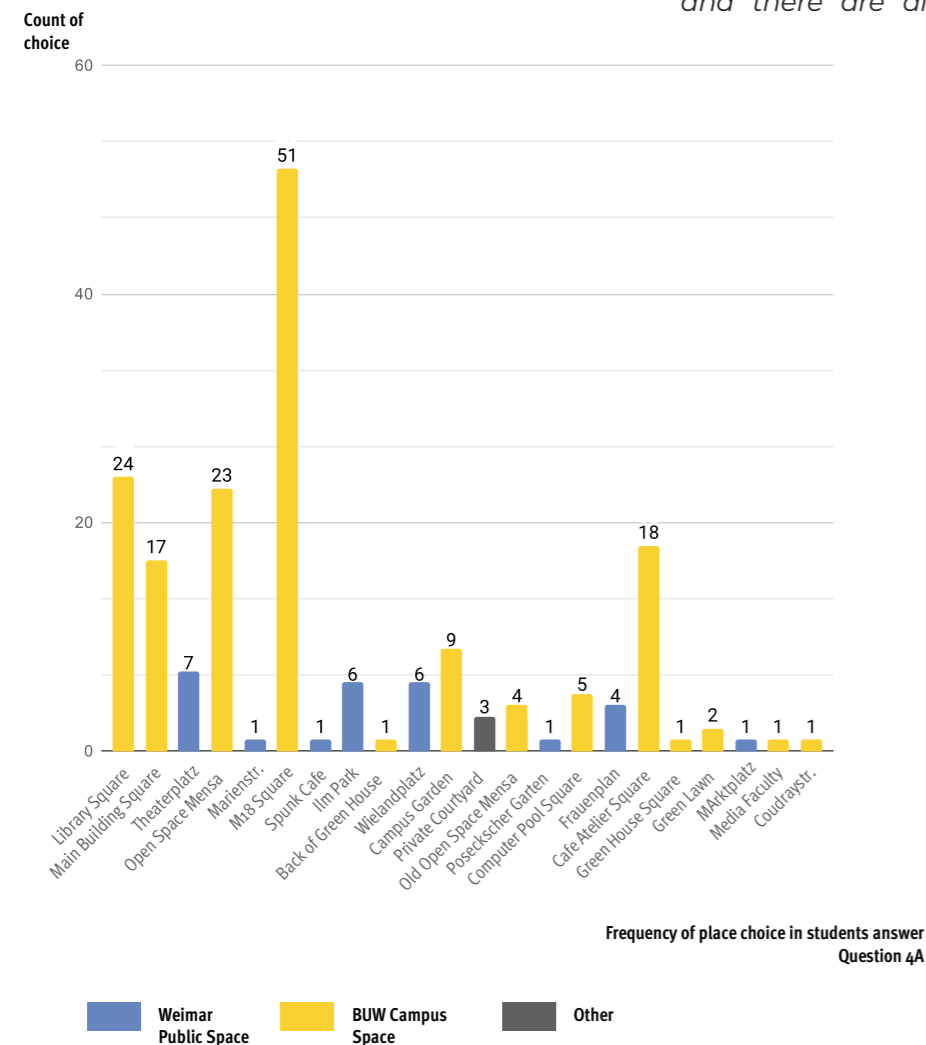


Figure 29. Frequency of place choice in students answer - Question 4A. Source: Author, 2021.

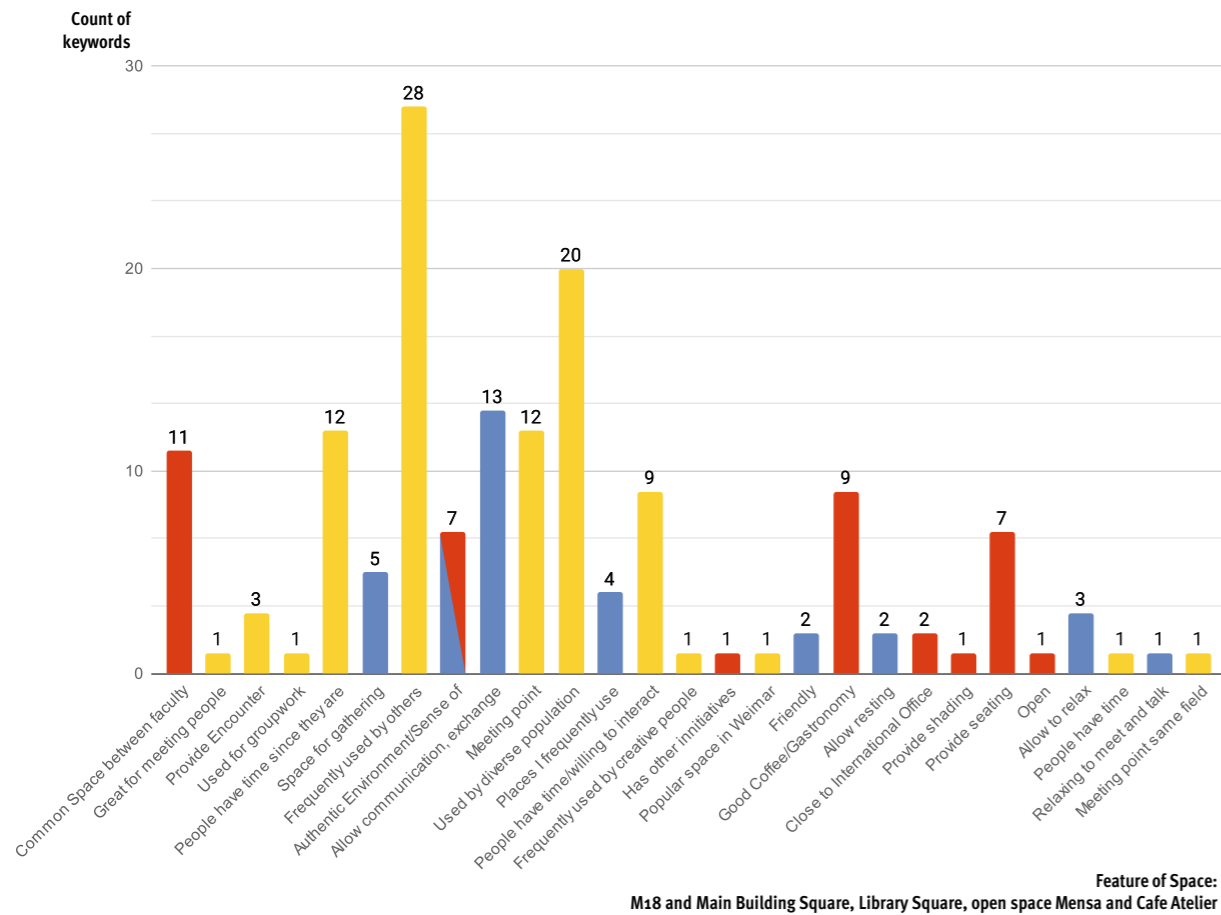
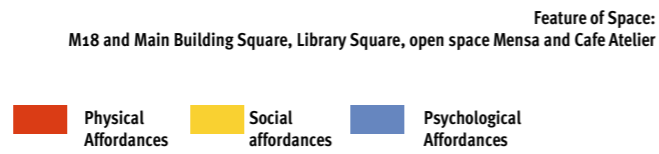


Figure 30. Reasons (keyword counting) for students when electing most preferred campus spaces as more likely to inspire frequent diverse encounters, classified by nature of affordance. Source: Author, 2021.



What is common on four most chosen spaces of the campus is that the keywords associated with the social affordances (90 count) are twice as mentioned as the psychological (39 count) and spatial affordances (39 count), see Figure 31. This demonstrates that the relationship between the environment and the students is predominantly influenced by the social and psychological aspects, characterizing physical affordances as the least influential on the context of the campus.

Such relationships between the physical, psychological and social affordances of places did not maintain the same relationship for each place individually (Figure 31).

At open space Mensa and cafe atelier square,

the physical affordances had more impact than the student's psychological affordances (Figures 32 and 33), whereas at the library square the psychological affordances impacted more than the physical ones (Figure 34). At the most chosen space, the M18 and Main Building square, both psychological and physical affordances had equivalent impact (Figure 35).

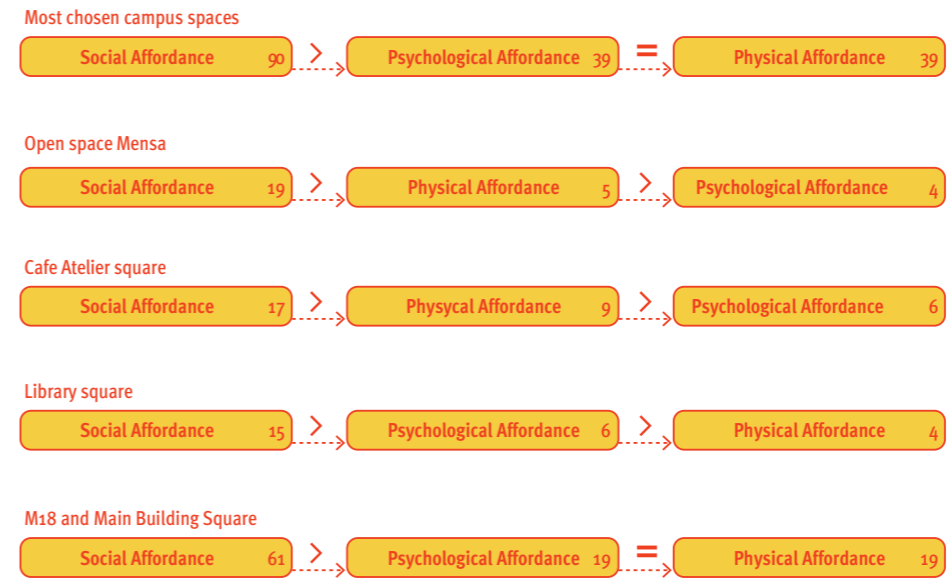


Figure 31. Relationship between social, physical and psychological affordances of a space when providing diverse and frequent encounters, from student's perspective (measured by number of keyword references). Source: Author, 2021, icon from thenounproject, 2021.

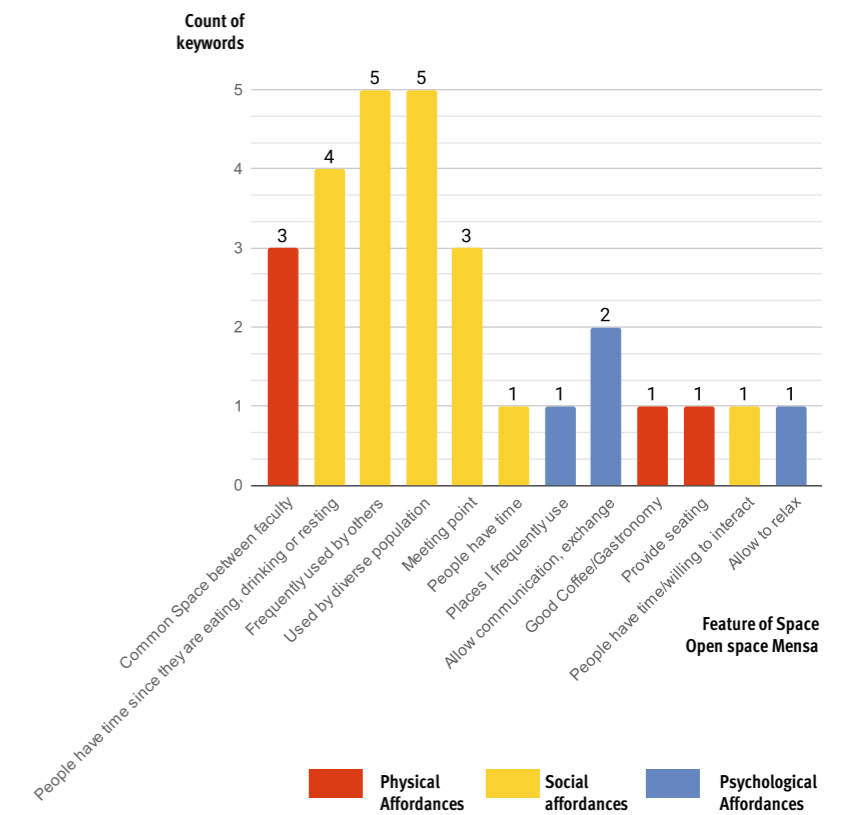


Figure 32. Reasons (keyword counting) for students when electing open space Mensa as more likely to inspire frequent and diverse encounters, classified by nature of affordance. Source: Author, 2021.



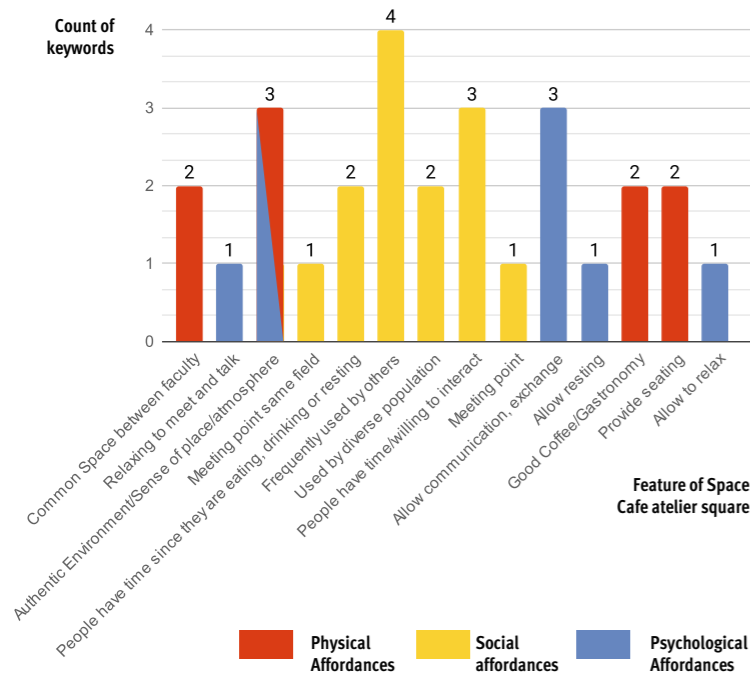


Figure 33. Reasons (keyword counting) for students when electing Cafe Atelier square as more likely to inspire frequent and diverse encounters, classified by nature of affordance. Source: Author, 2021.

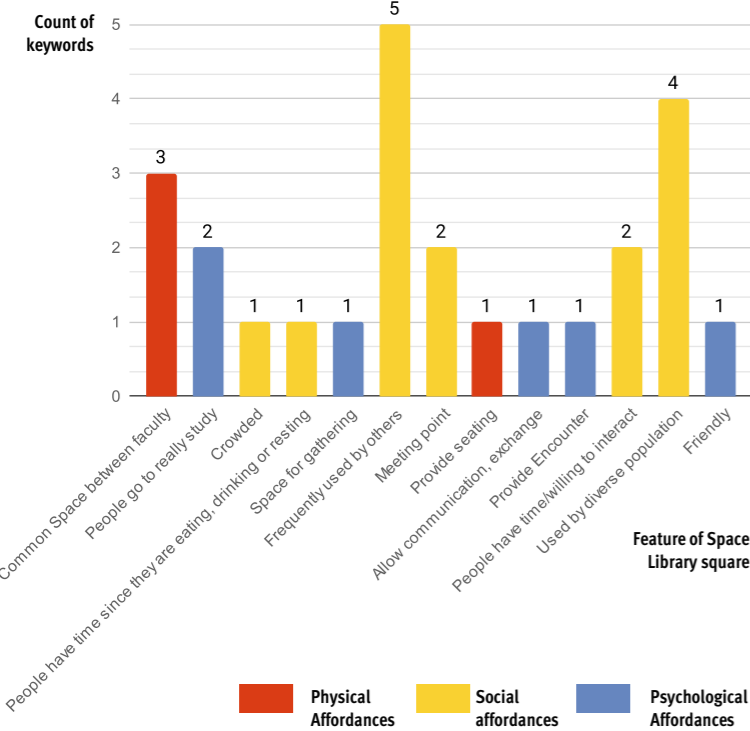


Figure 34. Reasons (keyword counting) for students when electing Library square as more likely to inspire frequent and diverse encounters, classified by nature of affordance. Source: Author, 2021.

In a closer investigation of the most influential physical features at the most voted campus spaces (combined), the most mentioned aspects for inspiring diverse and frequent encounters were the following: being a space shared by different faculties (11 counts), having gastronomy options available (9 counts) and

equally having an authentic environment and providing seating options (7 counts each). Some students were more descriptive and argumentative on why they selected some places, with some of the most insightful answers regarding the campus space as the following:

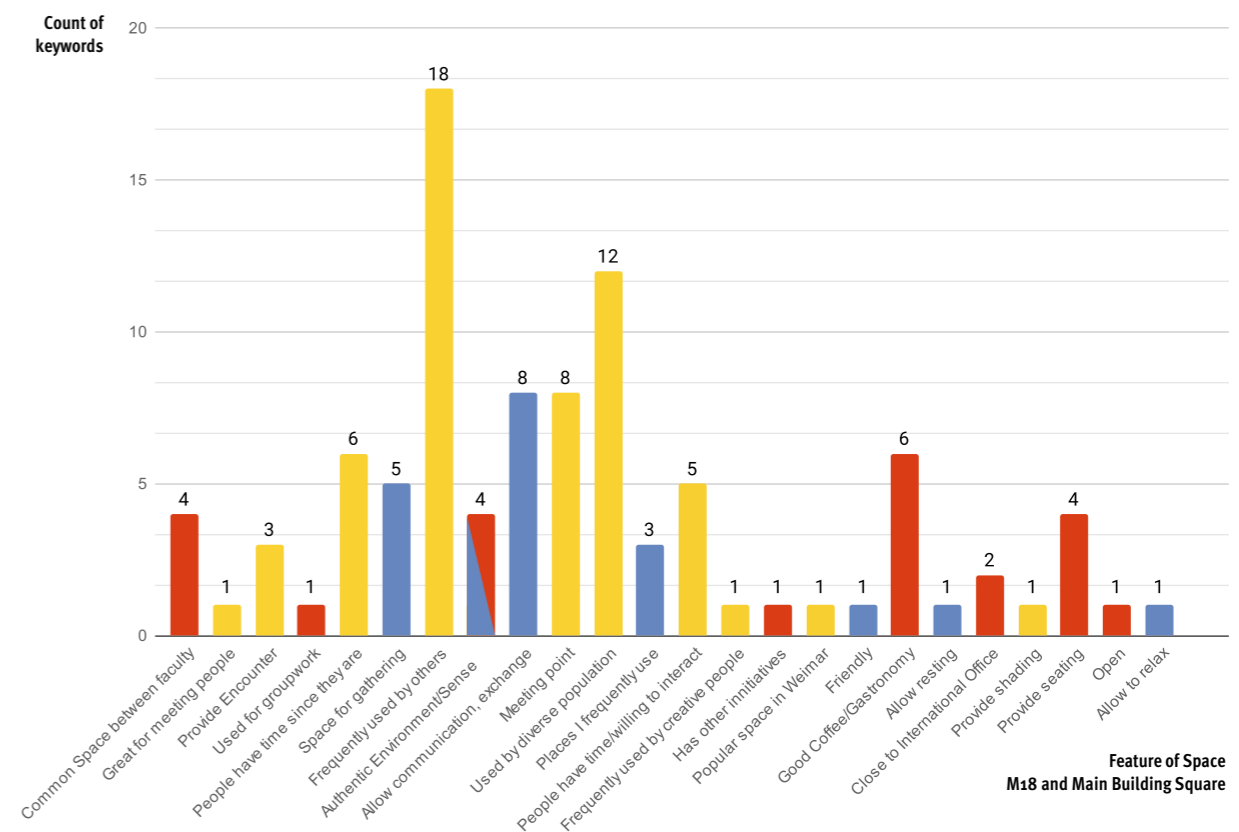


Figure 35. Reasons (keyword counting) for students when electing M18 and Main building square as more likely to inspire frequent and diverse encounters, classified by nature of affordance. Source: Author, 2021.

“in reality, i used to discuss ideas among any group work in those points. To my point of view, those are points which are rather closed to the uni or popular place in Weimar, which offer/allow for an atmosphere of communication” (Participant of questionnaire Ref.Nr. 6, in reference to Main Building square, Theaterplatz and Frauenplan).

“It has a diverse landscape made of different elements from the soft to the hard, it establishes a better sense of place and also provides better facilities for sitting and talking with different people from different backgrounds. Also, the furniture and buildings that encompassed the place have contributed a lot in making this place a popular gathering point among the students.” (Participant of questionnaire Ref.Nr. 29, in reference to Main Building square).

“The place in front of the main building makes a nice, protected area that is primarily used by students. It is big, but has places to be both in a big and small groups. Together with the insitution of the main buidling, creative studio spaces around and the M18, that is an absolute gathering point, it forms a super nice social place. It has shade, offers different modes of seating, offers huge gathering places, is open but on the same time closed. Many things..” (Participant of questionnaire Ref.Nr. 48, in reference to M18 square).

“I like the antmosphere at these places, because it is more informel, people are hanging around, having something to drink and talk to each other. Also these are green spaces, with seating areas and different options to hang out.” (Participant of questionnaire Ref.Nr. 62, in reference to M18 and Cafe Atelier square).

"I think it's places where even though there's a pandemic students encounter. Also, you can get coffee at M18 for example and sit down. It's also about seat possibilities."(Participant of questionnaire Ref.Nr. 67, in reference to M18 square).

"Most diverse: def. mensa, other than that: places where lots of people pass through, not only one faculty"(Participant of questionnaire Ref.Nr. 84, in reference to open space Mensa, Library and M18 square).

Map B - Informal collaborations

In Question 4B, students were asked to mark places according to the following statement: "Imagine you are doing a project together with two other students. You decide to go outside for a few hours and to brainstorm ideas. Which open space (not inside buildings) would you go?". This narrative question aims to collect the student perspective on the relation between informal collaboration and space preference, and it is related to hypothesis B (refer to Chapter 3, p.47).

From the group sample, all 83 participants shared their preferences, each student appointing from one to three places (non-hierarchical order), which provided a total of 185 points, later transferred to 184 referenced places. When overlapping all participants' place choices, the result is shown map Figure 36.

On the Figure 37 the graph demonstrates the students choice of places that would support collaboration, and these spaces were classified whether they belong to the Bauhaus University Weimar campus or to the city of Weimar. In such analysis, it was possible to notice that students appointed more frequently the campus spaces, as it was the tone of the question, however,

the proportion of such choices demonstrates that the spaces of Weimar were still highly appealing to the students (62%/114 points in Campus spaces against 38%/70 points in Weimar mostly in Ilm Park).

Analysing the students choices for campus spaces (Fig 37), the most referred were respectively: the M18 Square, cafe atelier square (grid cell L17, Fig. 36), Main building square, campus garden (Grid cells K15 and K15 Fig. 36) and Library square (grid cell J9 and J10, Fig. 36). Considering that Ilm park is not a facility from the university, but still students referred to it as a crucial space for informal collaboration, the analysis of this place would be performed in parallel with the actual campus spaces.

For this analysis, as in question 4A, the answers referring to the Main building square and M18 square would be calculated together due to the spatial condition of these places and the users' crossed reference to one another (see grid cells L16 and M16 in Figure 36).

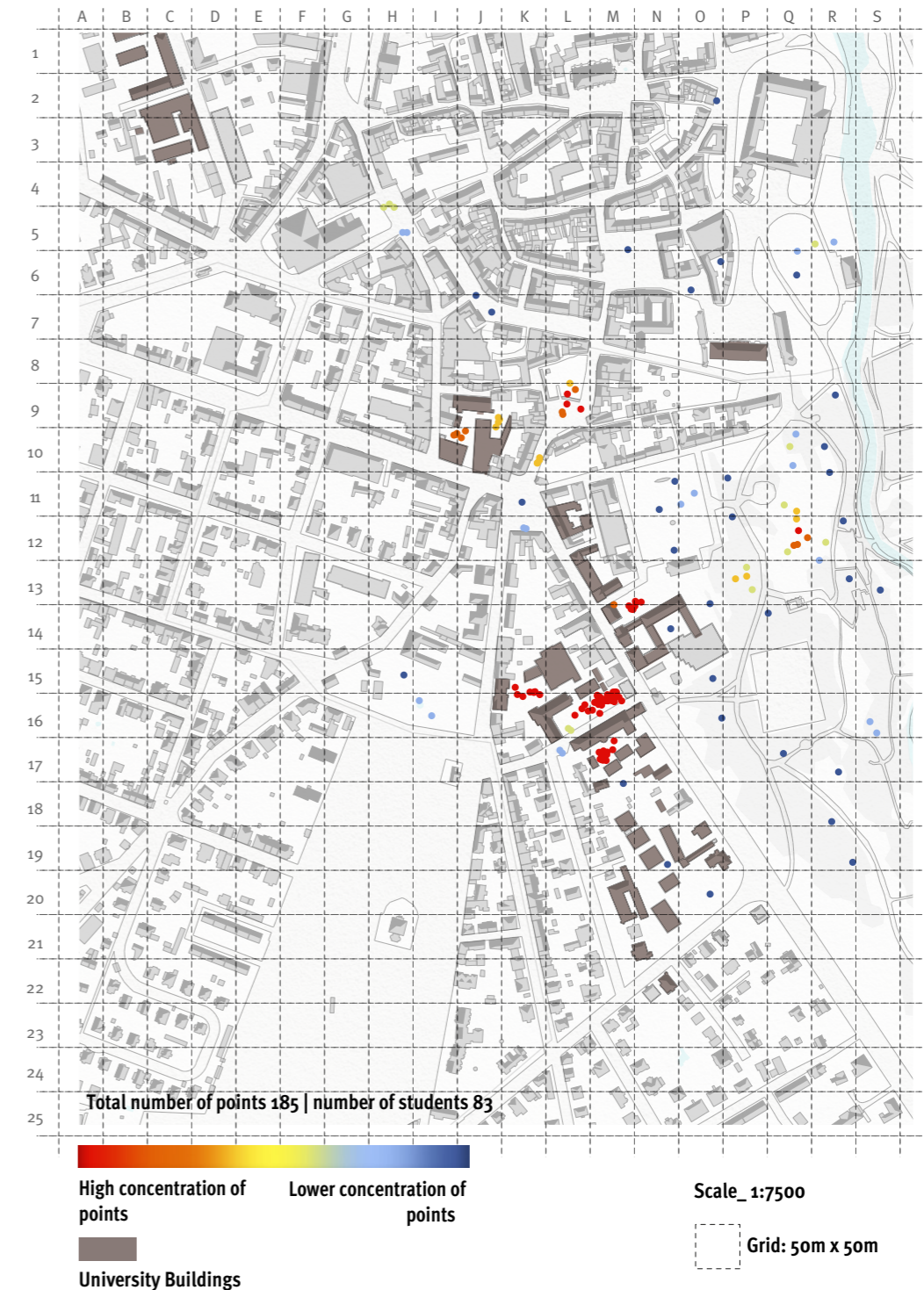


Figure 36. Students' answer for question 4B, regarding informal collaboration. Source: Author, 2021.

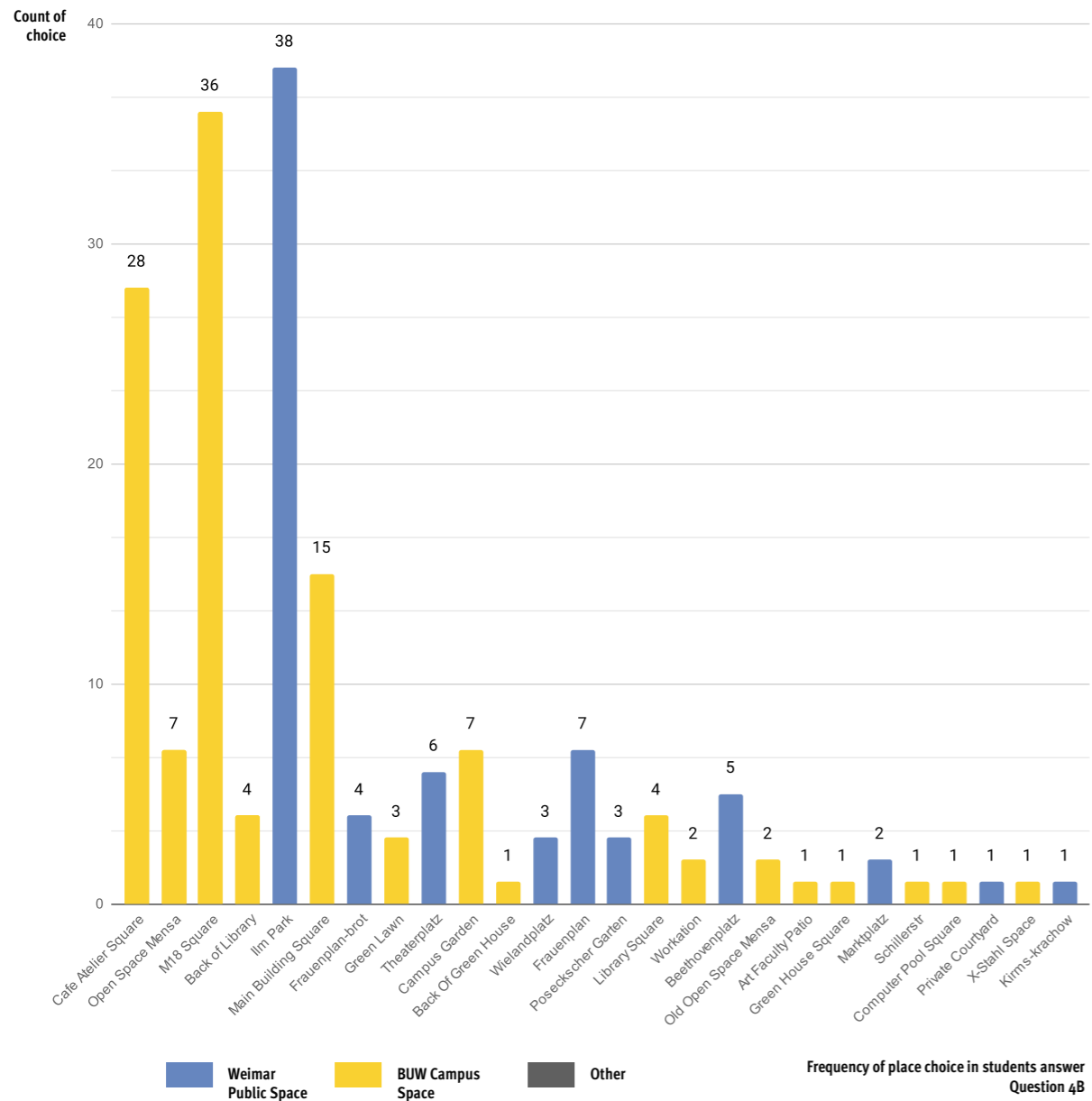


Figure 37. Frequency of place choice in students answer - Question 4B. Source: Author, 2021.

For the next research phase, the goal was to investigate which affordances students associate with a scenario of informal collaboration. From the 83 participants, 15 students would not give detail on their choice, leaving a rather limited data set since many quantitative answers were descriptive, or inconclusive.

For that every qualitative student participation was associated with keywords then performed statistical analysis of the reasons attributed

by the participants for choosing the campus spaces (Fig. 38) and Ilm park (Fig.39).

From these graphs (Fig 38 and 39), it was possible to notice that for all spaces, regardless of belonging to the campus or to the city, the physical features predominated as affordances for collaboration. Moreover, such relation in the campus was especially evident since the physical features were more than double times recalled as affordances that social and psychologically related features combined. (see diagram Fig. 40).

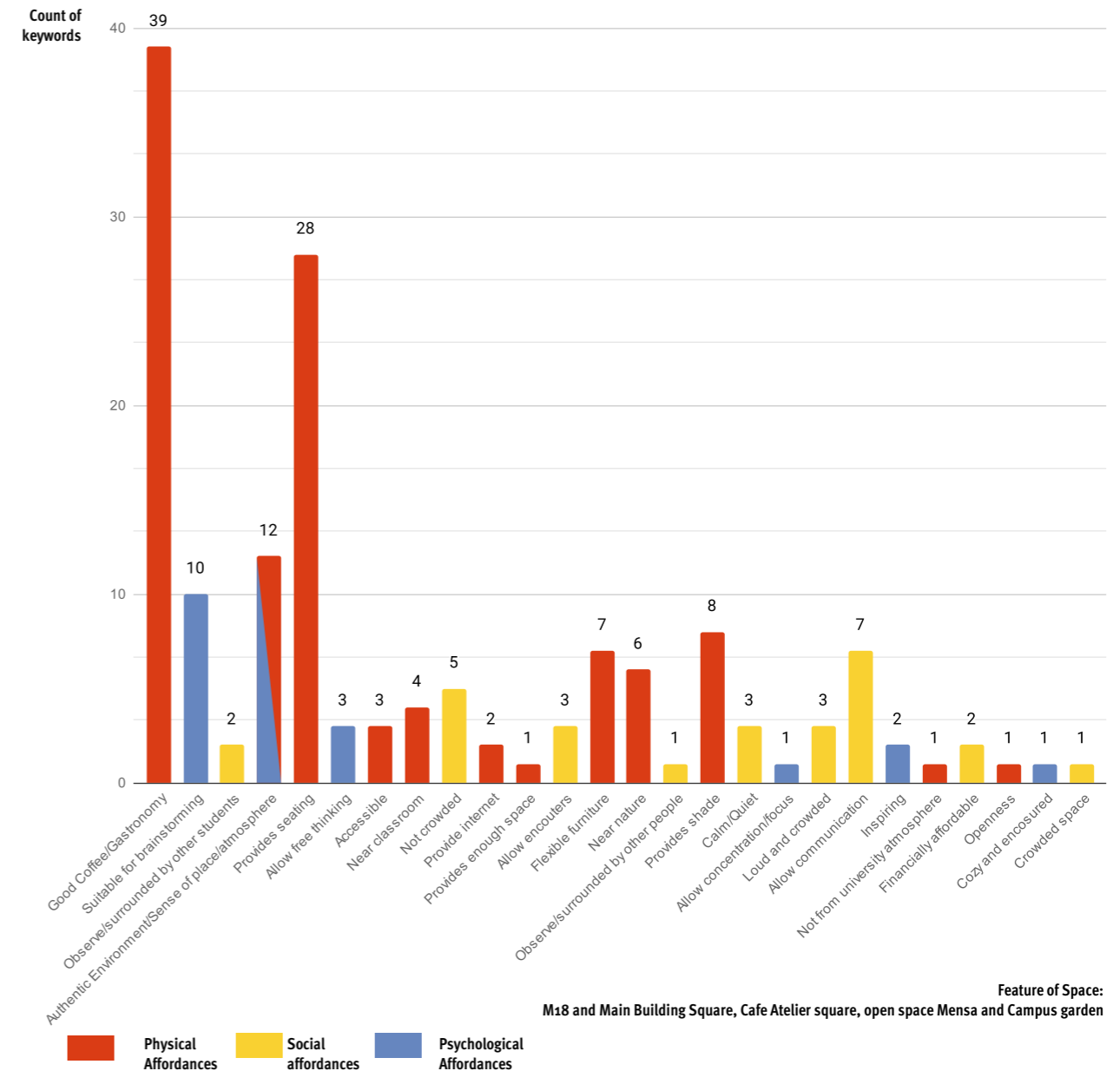


Figure 38. Reasons (keyword counting) for students when electing campus spaces (M18 and Main building square, Cafe atelier square, open space Mensa and Campus garden) as more likely to inspire informal collaboration, classified by nature of affordance. Source: Author, 2021.

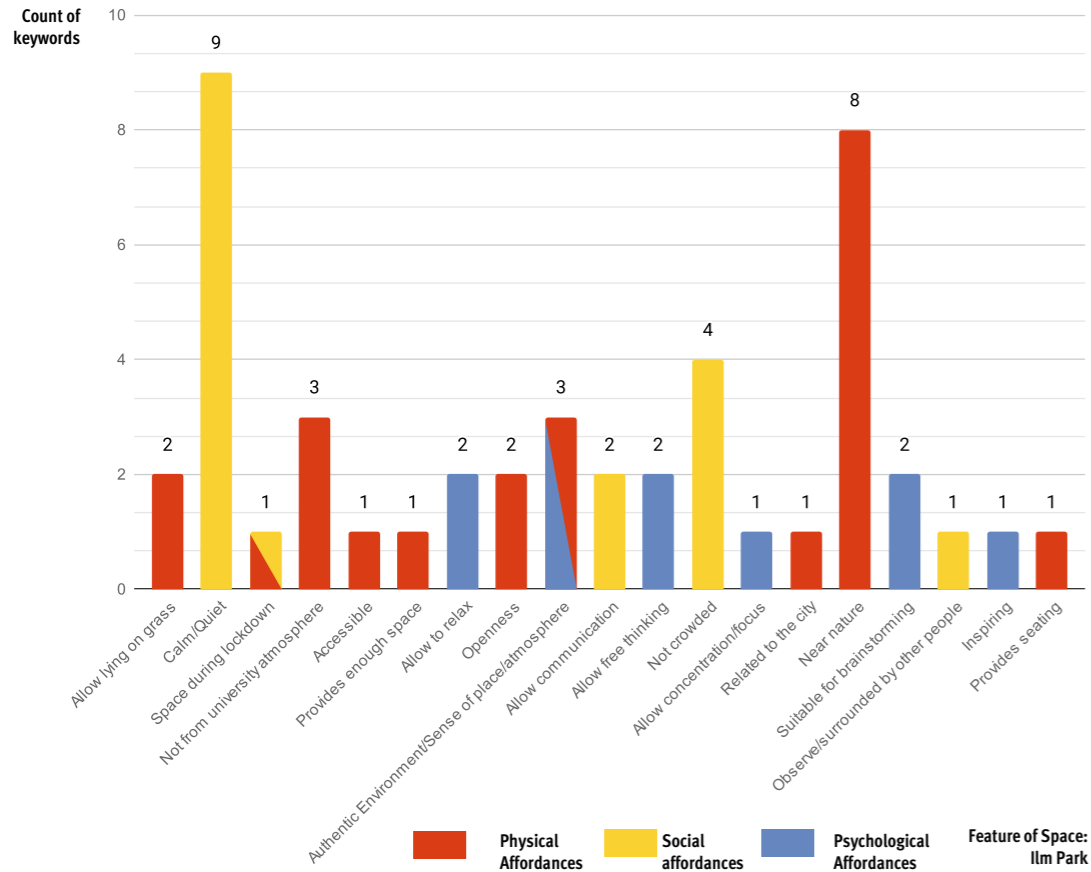


Figure 39. Reasons (keyword counting) for students when electing Ilm park as more likely to inspire informal collaboration, classified by nature of affordance. Source: Author, 2021.



Figure 40. Relationship between social, physical and psychological affordances of a space when providing informal collaboration, from student's perspective (measured by number of keyword references). Source: Author, 2021, icon from thenounproject, 2021.

In the same diagram (Fig.40) it can be noticed that for the individual spaces, still the physical features remained as more relevant affordances, however, for some spaces (Cafe atelier Square and Ilm Park) the social features were more relevant than psychological features. Meanwhile, for M18 and Main building square the social aspects was slightly less relevant as affordance for informal collaboration, these

analysis results can be observed in detail in Figures 41 and 42.

For open space Mensa and Campus garden the data set lacked statistically relevant information which could inform this analysis, since students provided mostly only the point locations. Still, these spaces would be further analyzed later in this chapter.

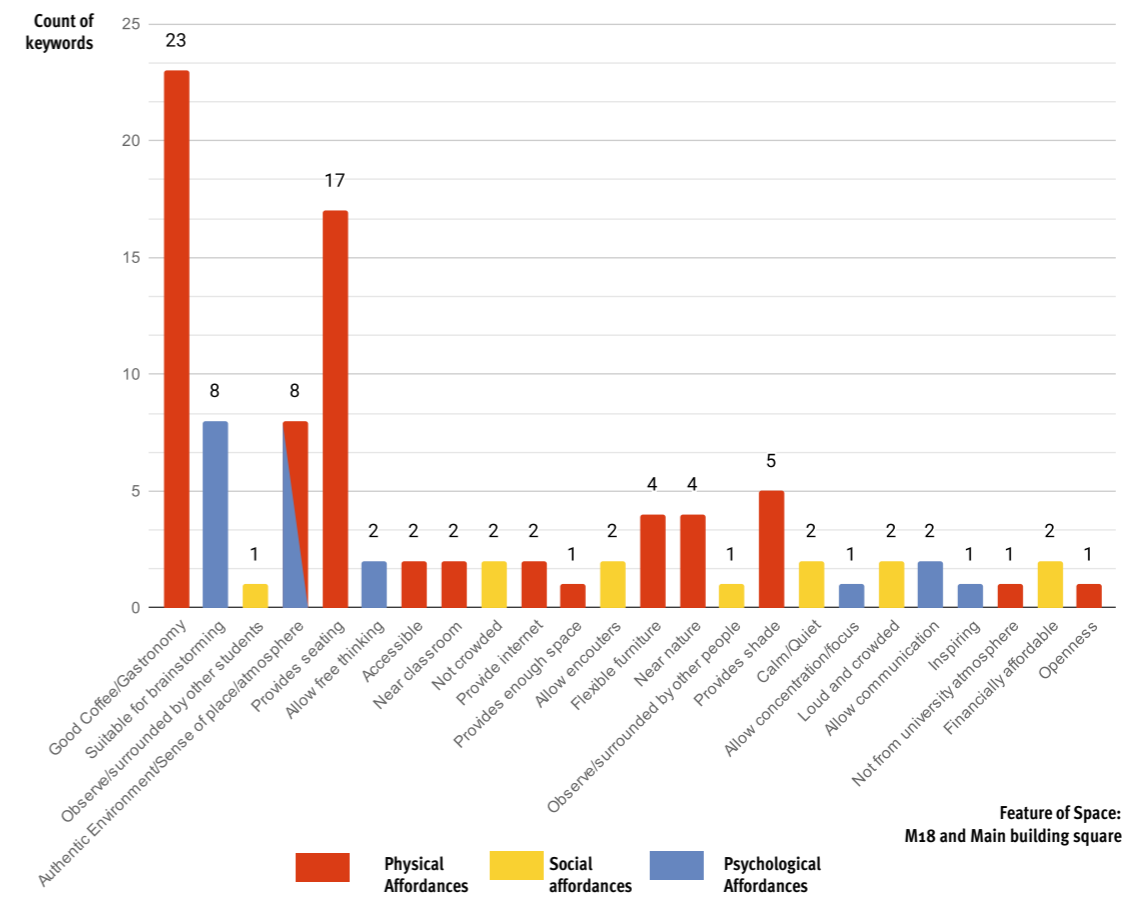


Figure 41. Reasons (keyword counting) for students when electing M18 and Main building square as more likely to inspire informal collaboration, classified by nature of affordance. Source: Author, 2021.

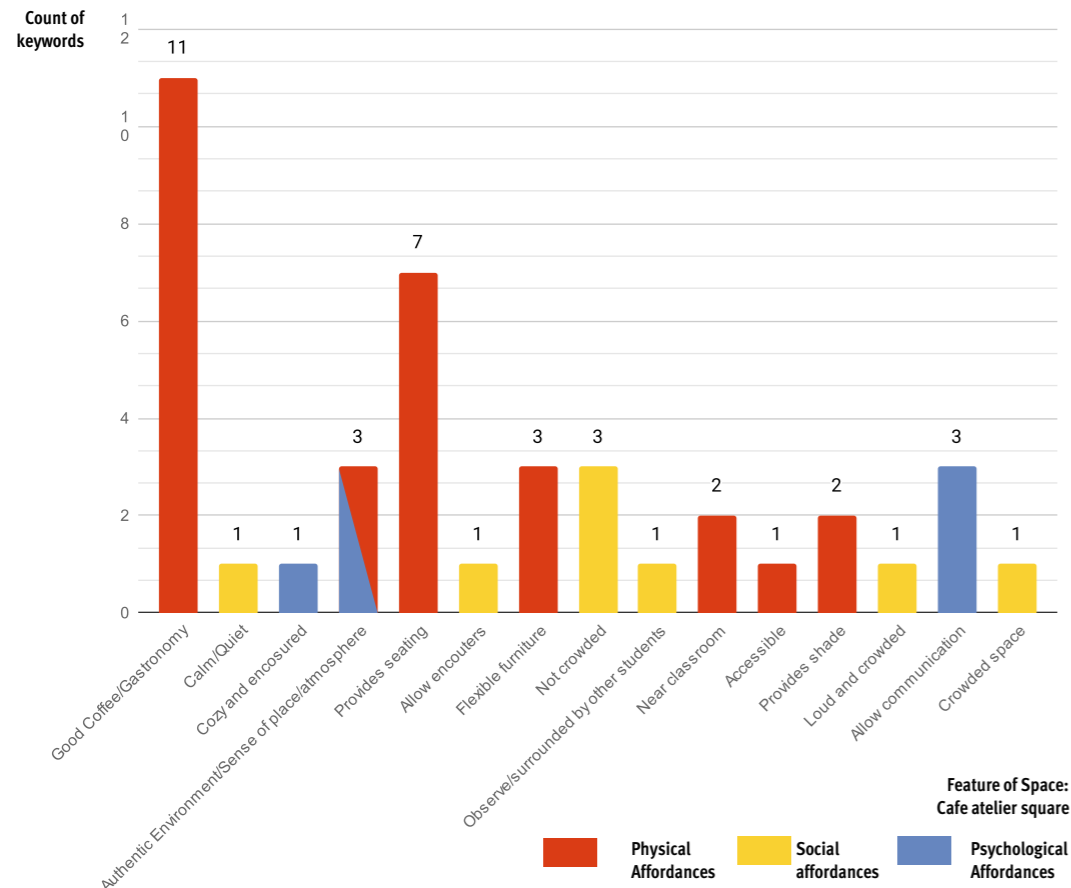


Figure 42. Reasons (keyword counting) for students when electing Cafe Atelier square as more likely to inspire informal collaboration, classified by nature of affordance. Source: Author, 2021.

Other two spaces were highly appointed by the students, however, when choosing these spaces many participants didn't provide enough detail as early mentioned in this chapter, then such spaces would be analysed by an in depth evaluation of the provided qualitative data instead of their statistics.

One of these spaces was the open space at Mensa, which was appointed by 9 students as a space for informal collaborations. These students have a diverse background of studies, all coming from different courses in Engineering, architecture, urban studies and art, which also indicates the sharing feature of this university facility. As expected for a Mensa, most students related their collaboration process at this space to availability of food,

feeling of comfort, seating and less formal setting, for example in the following remarks:

"The mensa and the main building, because there are trees to sit under and you can get something to drink" (Participant of questionnaire Ref.Nr. 81, in reference to open space Mensa and Main Building square).

"All of these sites have seating and places to grab a snack or coffee, I find these aspects important if I am going to work outside with someone else. (Seats and food near in case we get hungry)"(Participant of questionnaire Ref. Nr. 2, in reference to open space Mensa, M18 Square and Cafe Atelier square).

Next space was the Campus garden, chosen by 7 students. Such students have a very varied range of study backgrounds, including MSc and BSc levels, on the fields of art, architecture, urban studies and media, configuring the space as a shared choice between different groups. The reasons appointed for defining this space, was mostly related more to the intangible quality of place (quiet, pleasant environment), than to its physical features, for example in the following statements:

"in front of the main building, close to m18 cafe: there is coffee and enough space to sit comfortably. at teh campus garden, it's more quiet. behind the main builing at the bauhaus atelier, there is coffee and it's close to the workrooms and workshops" (Participant of questionnaire Ref.Nr. 72, in reference to M18 and Main building square, Campus garden and Cafe Atelier square).

"The gardens around the main building and the ilm park provide some pleasant spaces to sit and enough quite to talk about projects."(Participant of questionnaire Ref.Nr. 54, in reference to Ilm Park, Campus garden and grid cell L18 on Fig.36).

When looking at the student choices for informal collaboration, students presented a pattern, with the most relevant physical features being: the availability of amenities such as food and drinks offers (39 counts Fig. 38), seating, with recurrent remarks on movable and adaptable furniture (27/7 counts Fig. 38), shade (6 counts Fig. 36) and greenery (6 counts Fig. 38). Another recurrent aspect was the sense of a specific atmosphere, which possibly might relate to the three types of features (physical, social and psychological affordances). Moreover, the Ilm Park as a public space represented

a complementation of the formality of the campus space, with many students attributing their choice for this space to the detachment from the academic environment. Such conclusion can be illustrated through some of the most insightful students answers to 4B: When addressing the question to space:

"It is close to a place to get food or drinks and usually not so crowded so it is easier to talk with other, besides being able to move the furniture there makes easier to work in an informal way-"(Participant of questionnaire Ref.Nr.2, in reference to M18 and Main building square).

"These places offer coffee and sitting opportunities as well as shade. What is missing is electricity..."(Participant of questionnaire Ref. Nr.11, in reference to M18 and Main building square and Cafe Atelier square).

"I can only think of the M18 and maybe the Atelier for that. There you have kind of a seating area, more people work there, but it is also a little loud and crowded which I always [!] like to surround myself with whilst brainstorming" (Participant of questionnaire Ref.Nr.18, in reference to M18 and Main building square and Cafe Atelier square).

"its possible to sit/having kind of a desk. Coffee spots - so its some kind of a break feeling as well. no pressure to find a solution like you're sitting in an office...I like it when its a bit crowded (maybe not the best for concentration but I like that for a brainstorm)" (Participant of questionnaire Ref.Nr.49, in reference to M18 and Main building square, Cafe Atelier square and south-Frauenplan).

Map C - Contemplation and Reflection

"M18 and Atelier Cafe Garden has a really authentic university environment. Seats in front of Brot are comfortable and are worth to pay the expensive coffee."(Participant of questionnaire Ref.Nr.17, in reference to M18 and Main building square, Cafe Atelier square and south-Frauenplan)

When mentioning about spaces of Weimar, including Ilm Park:

"Not to open as Wielandplatz but still you can watch the other students for feel the nature. (Temporary Mensa is also good for sit & eat with talking)". (Participant of questionnaire Ref. Nr.16, explaining the choice for M18 and Main building square and open space Mensa)

"I would definitely prefer the Ilm Park, however if I need to pick an open space of the campus, I would again chose the main courtyard. M18 is a really nice facility for students, while sipping my nice coffee where I take it from there, I would enjoy debating my ideas in the main courtyard."(Participant of questionnaire Ref. Nr.19, explaining the choice for M18 and Main building square)

"If you need a break for creativity, is my opinion that you should get out of the Uni. And give yourself space. I associte the Uni with a chore rather than a creative space. And most of the buildings are not welcoming, rather they feel closed and isolated." (Participant of questionnaire Ref.Nr.34, explaining the choice for Ilm Park, Marktplatz and Theaterplatz).

For the last question to be evaluated from the questionnaire (4C), students were asked to share their spatial choices regarding contemplation and reflection, and such a statement is related to Hypothesis C (refer to Chapter 3, p.47).

The question "Imagine, in your group you discussed for hours. Your mind is full and you decided to stop for today. In one hour you have to attend a lecture. In between, where would you go to relax (not inside buildings)?" As in previous questions it was also provided a field to describe their answer.

From the 83 questionnaires, only one participant didn't reply to the question, and the others appointed from one to three locations each, forming a total of 194 dots across the map (Fig. 43). Furthermore, 69 of the participants provided comments on their choices, providing the data set for qualitative aspects.

According to the statistics of such points (Fig. 44, next page), the most chosen spaces are actually related to the city of Weimar instead of Bauhaus University Campus, (102/ 95 points respectively). This choice confronted the academic environment provided by the question narrative, as it can be observed on the participation of some students:

"I would relax by drinking a nice coffee at the bauhaus-cafe, but I honestly prefer the theaterplatz because of the nice atmosphere and food-possibilities" (Participant of questionnaire Ref.Nr. 5, in reference to Theaterplatz, Wielandplatz and M18 and Main building square).

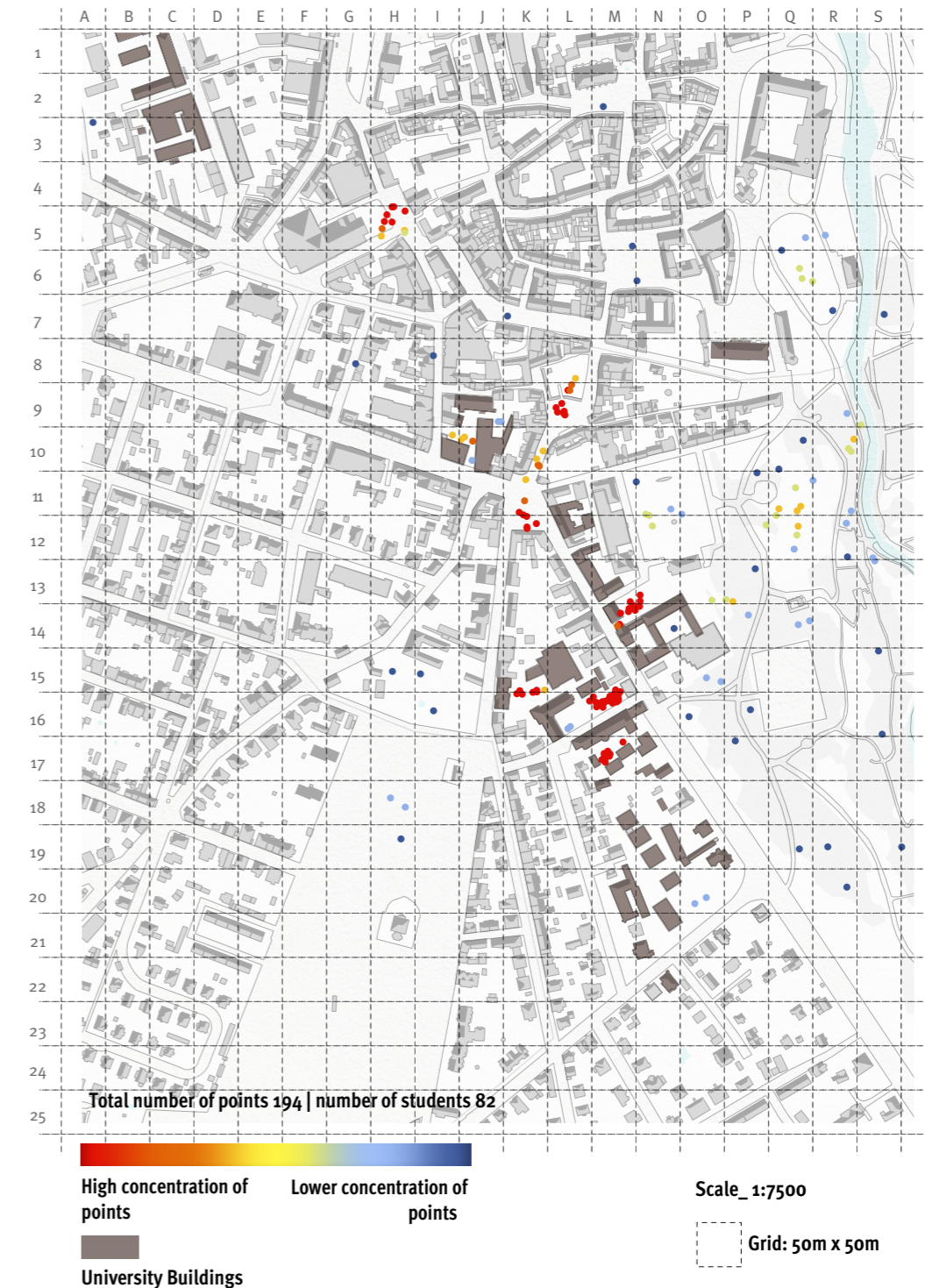


Figure 43. Students' answer for question 4C, regarding contemplation and reflection. Source: Author, 2021.

"The campus is very fracture and intertwine with the city, it gives you the opportunity of easily leave it and go to a cafe or another space. If a have free time to relax I dont think I would chose the univerity campus., rather the open areas next to it."(Participant of questionnaire Ref.Nr. 34, in reference to south Frauenplan and Wielandplatz).

As mentioned in previous analysis of the questions 4A and B, the answers referring to the Main building square and M18 square would be calculated together due to the spatial

condition of these places and the users' crossed reference to one another (see grid cells L16 and M16 in Figure 43).

The most chosen spaces in the city were near the campus, with the Ilm Park accumulating almost 50% of the city references, followed by Frauenplan (cells L8,L9 Fig. 43), Beethovenplatz (cells N11, N12, O11,O12 Fig.43) and Theaterplatz (cell H5 Fig. 43).

For the spaces from the campus, the M18 and Main building, then Cafe Atelier square, open space Mensa, Campus garden and Library Square.

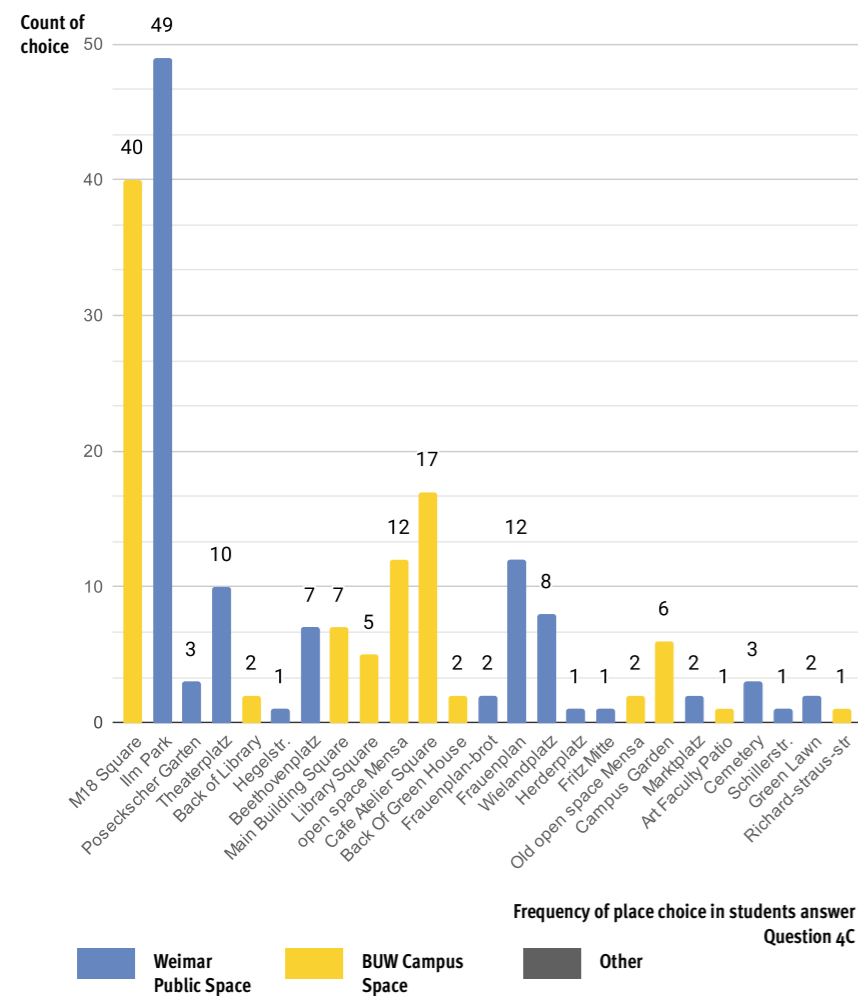


Figure 44. Frequency of place choice in students answer - Question 4C. Source: Author, 2021

Following the trend noticed from the user experience in subsequent statistical analysis, the most voted places would be separated into the spaces from the campus (M18 and Main building square, Cafe atelier square and open space Mensa) and the public spaces of Weimar (Ilm Park and Frauenplan). Such analysis aims to get an insight on the reasons why students would have had their answers towards the city spaces and which are the features that would attract them to stay on campus when seeking for relaxation and contemplation, considering the context of the question.

To investigate this aspect, the previous method of attributing the participants' answer to keywords was again applied to the qualitative answers using and then performing statistical analysis. The most selected spaces were separated in two groups, the ones which belong to Bauhaus University campus and the ones which are public spaces of Weimar, and the results can be seen on the graphs, respectively Fig. 45 and 46.

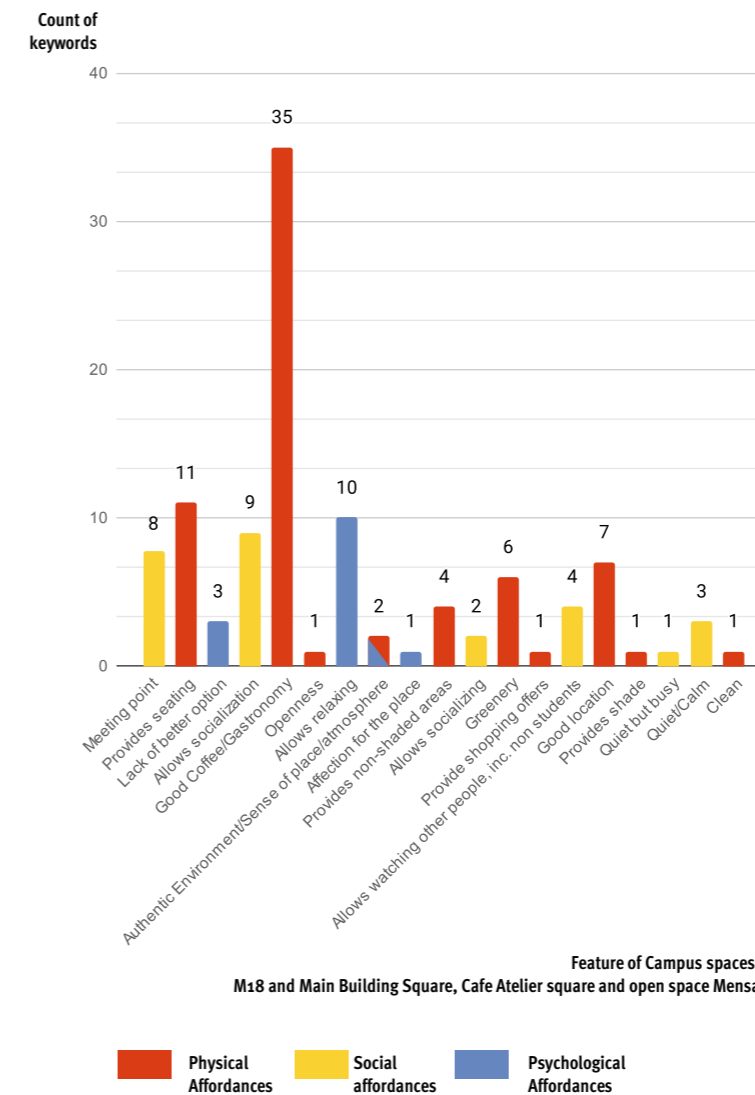


Figure 45. Reasons (keyword counting) for students when electing campus spaces (M18 and Main building square, Cafe atelier square, open space Mensa) as allowing for contemplation and reflection, classified by nature of affordance. Source: Author, 2021.

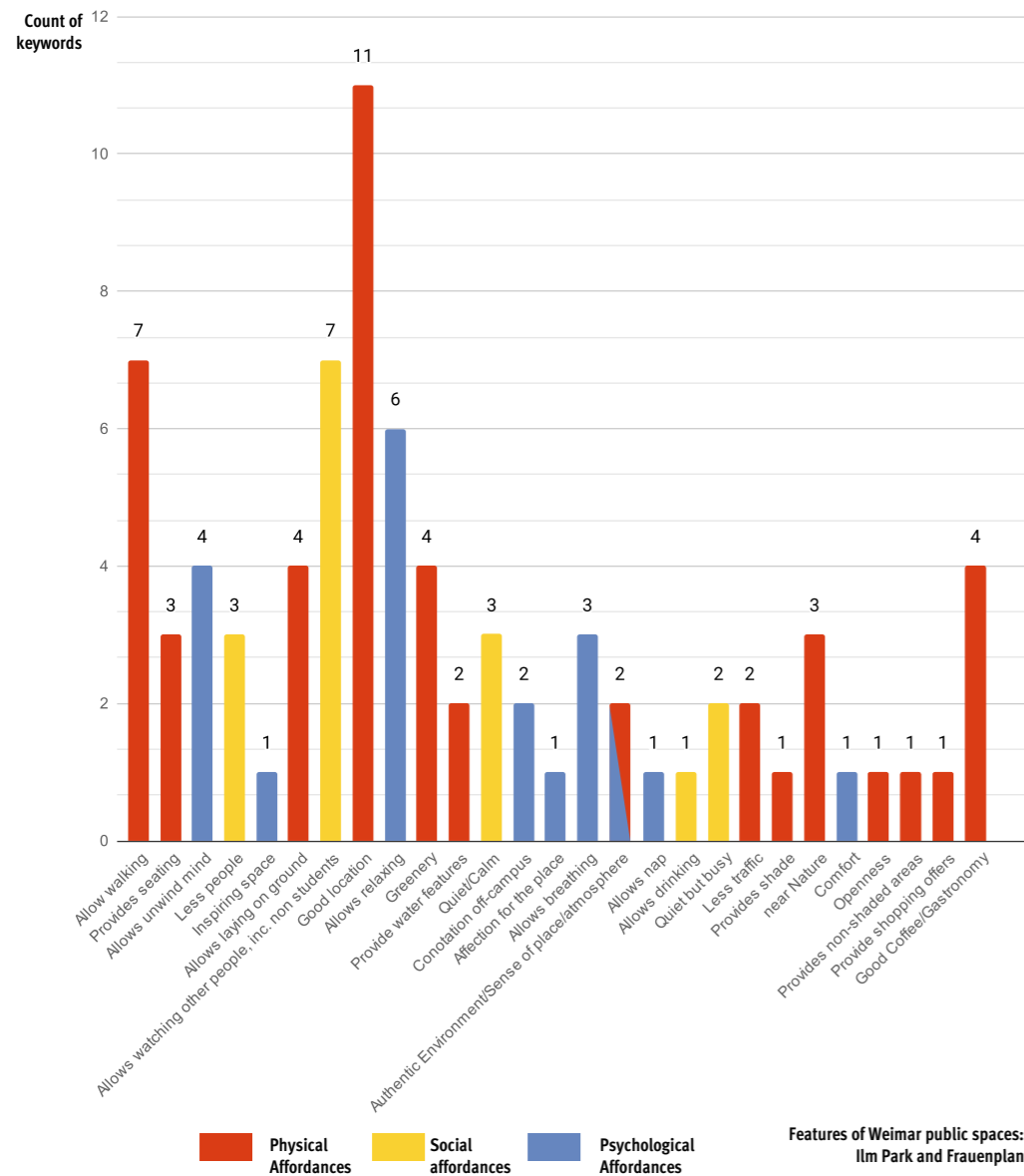


Figure 46. Reasons (keyword counting) for students when electing Weimar's public spaces (Ilm Park and Frauenplan) allowing for contemplation and reflection, classified by nature of affordance. Source: Author, 2021.

Considering such statistics, it was possible to notice different relationships between the nature of the appointed feature by the student (as physical, social and psychological affordances). For both groups of spaces, the physical features predominated as affordances for the contemplation and reflection, a result that was not expected from the subjective nature of the concept (see chart on Fig. 47). Comparing the public to the campus spaces, they also presented a pattern of distribution with

the social affordances being more important to the student than their psychological referenced features of the place. For the public spaces, however, this relationship was the opposite, with the social feature affordance being less important. This analysis already set a trend on the behavior, in which the students chose the campus spaces for reflecting amidst having a more socializing, contemplation experience.



Figure 47. Relationship between physical, social, and psychological affordances of a space when allowing for contemplation and reflection, from student's perspective (measured by number of keyword references). Source: Author, 2021, except ">" icon from thenounproject, 2021.

Looking at such relations for each space from the groups, they followed the pattern of their group each from the city or campus, a fact that was not observed in the previous questions. The next step is to examine the features appointed to the spaces and how they relate to the user experience.

At the most appointed campus spaces (Fig. 48, 49 and 50), the most relevant spatial features were the availability of gastronomy options, followed by seating, good location and greenery. The greenery feature was a highlight on this section, and the following quotes from students exemplify their contemplation related experience on these spaces:

"If I have to choose one from campus open spaces, I pick the open space of Mensa. It is close to the park and I can refresh myself. But

also I prefer as a second spot as Frauenplan or definitely Ilm Park because of their proximity to my institute building." (Participant of questionnaire Ref.Nr. 19, in reference to open space Mensa, IlmPark and Frauenplan)

"In my opinion, M18 and Bauhaus Atelier are the best spots to come down and sit together. Because of the gastronomic offers, but also because there is a lot of green (little trees and also a nice lawn etc.). I also like the Theaterplatz to sit down and observe people while drinking a coffee or a glass of wine, because it is a central meeting point." (Participant of questionnaire Ref.Nr. 73, in reference to Theaterplatz, Cafe Atelier square and M18 and Main building square)

“Peaceful, but no too much. Always people around, sometimes even parties. M18 offers coffee. Otherwise I would say that for real quietness and escape I would prefer the Ilmpark, the big area where students gather also.” (Participant of questionnaire Ref.Nr. 48, in reference to Ilm park and M18 and Main building square).

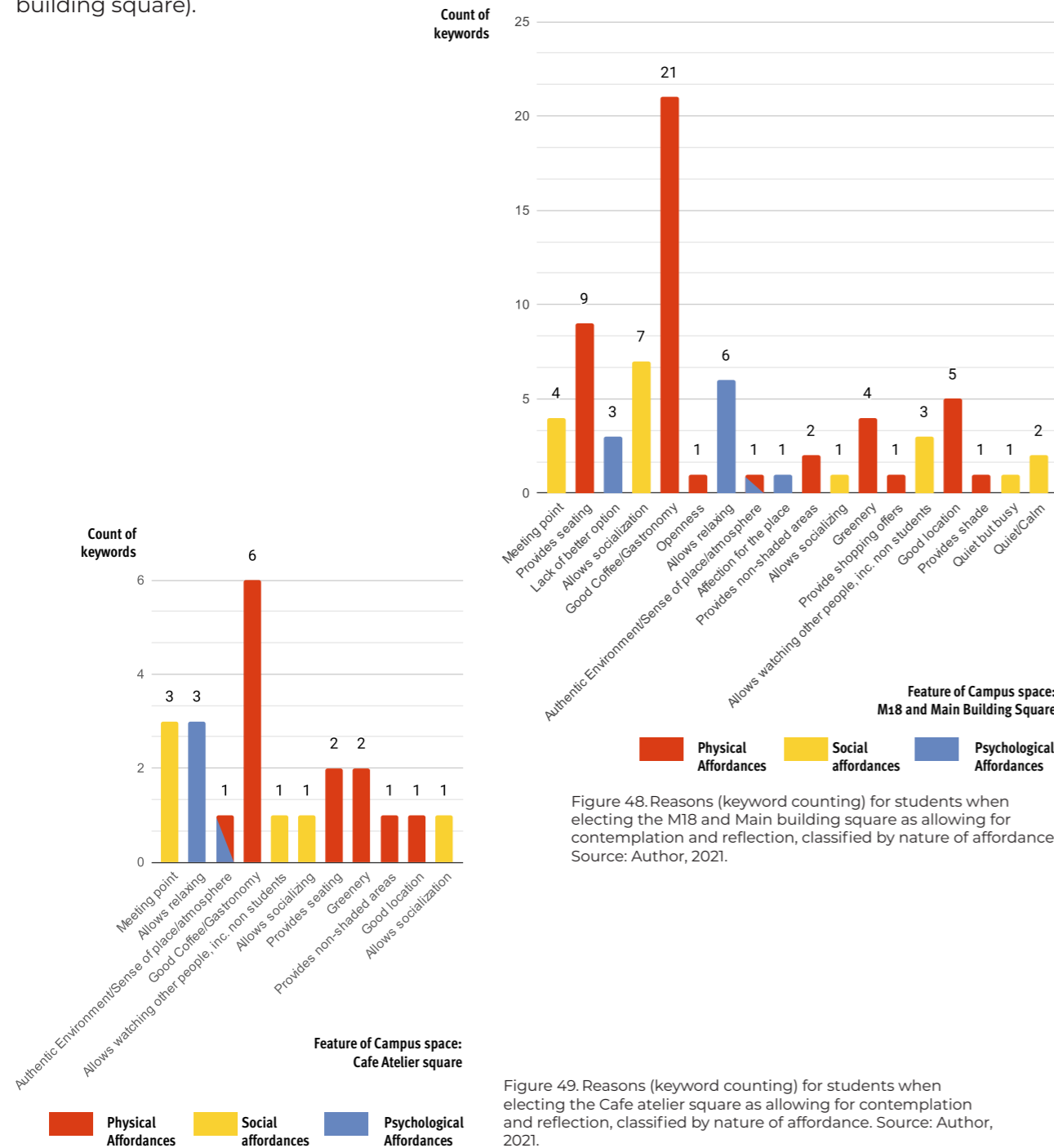


Figure 48. Reasons (keyword counting) for students when electing the M18 and Main building square as allowing for contemplation and reflection, classified by nature of affordance. Source: Author, 2021.

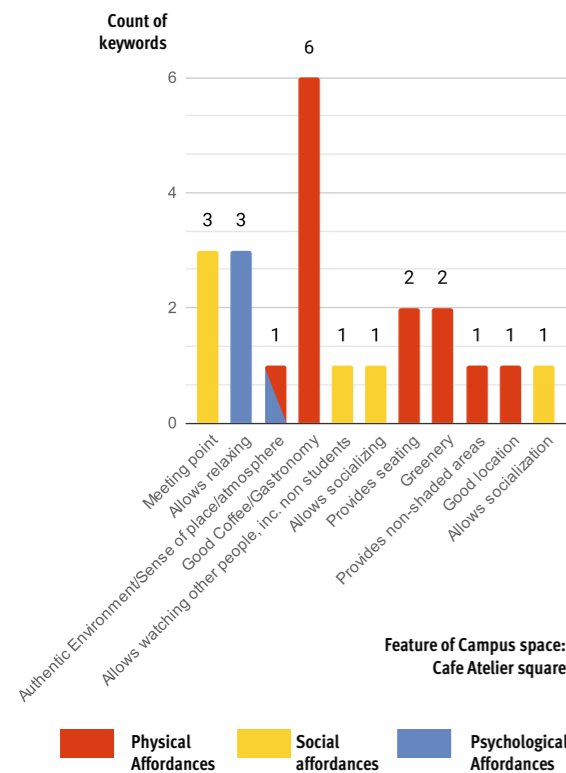


Figure 49. Reasons (keyword counting) for students when electing the Cafe atelier square as allowing for contemplation and reflection, classified by nature of affordance. Source: Author, 2021.

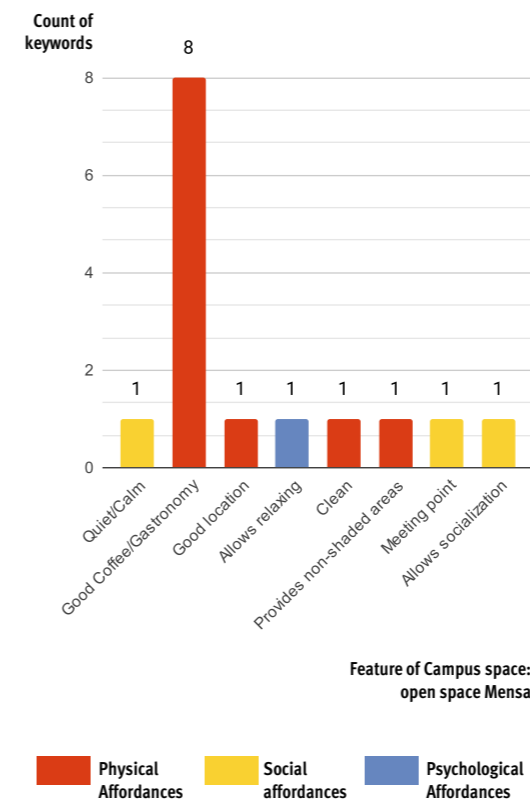


Figure 50. Reasons (keyword counting) for students when electing the open space Mensa as allowing for contemplation and reflection, classified by nature of affordance. Source: Author, 2021.

Observing the student’s preferences towards public spaces of Weimar, it is important to observe these were largely appointed by the students, and even their qualitative answers tend to refer to these spaces, especially to the Ilm Park. Differently from the group of the campus spaces, for the single public spaces, the feature preferences of the students had different patterns. For the Ilm park (Fig. 51), the most important spatial features were the good location, allowance for walking and lying on ground, greenery and seating provision . Meanwhile for the Frauenplan (Fig. 52, next page) the most appointed features were gastronomy offers, followed by good location and presence of nature. On the following statements it can be read the character of the students reply:

“because those are places where you don’t get confronted with uni and/or get food for the break” (Participant of questionnaire Ref.Nr. 53, in reference to open space Mensa, Frauenplan and Ilm park).

“I usually go in the Ilm Park, in a part which is closer to where I’ll have the next lecture. If it’s too far, I go in the green space in front of Versilia or by the benches in Frauenplan. Also m18 and the benches around it or the green spot next to it can work), but i enjoy m18 only if there are people, not when the bar is closed and nobody is around” (Participant of questionnaire Ref.Nr. 46, in reference to Frauenplan, Ilm park and M18 and Main building square).

“The Kiwi is a quiet place not far from the uni where I can take off the shoes, lay down and take a nap. The M18 garden is also a good option if I want to have a beverage but sometimes the benches are taken. In Beethovenplatz there is always a place to sit under the trees” (Participant of questionnaire Ref.Nr. 13, in reference to Ilm park, Beethovenplatz and M18 and Main building square).

“For relaxing after hard working, it’s good to expose myself fully to the others. Such as Wielandplatz or around the library with Fritz Mitte?” (Participant of questionnaire Ref.Nr. 16, in reference to Wielandplatz and Library square)

“KiWi is a chilled area where you get to see people outside university. Poseckschen garden has cool swings. (However they are busy during daytime) The cemetery is quiet and allows me to organize my thoughts.” (Participant of questionnaire Ref.Nr. 17, in reference to Poseckscher garden (grid cell H15, Fig.43), Ilm Park and cemetery (Grid cell H19, Fig. 43).

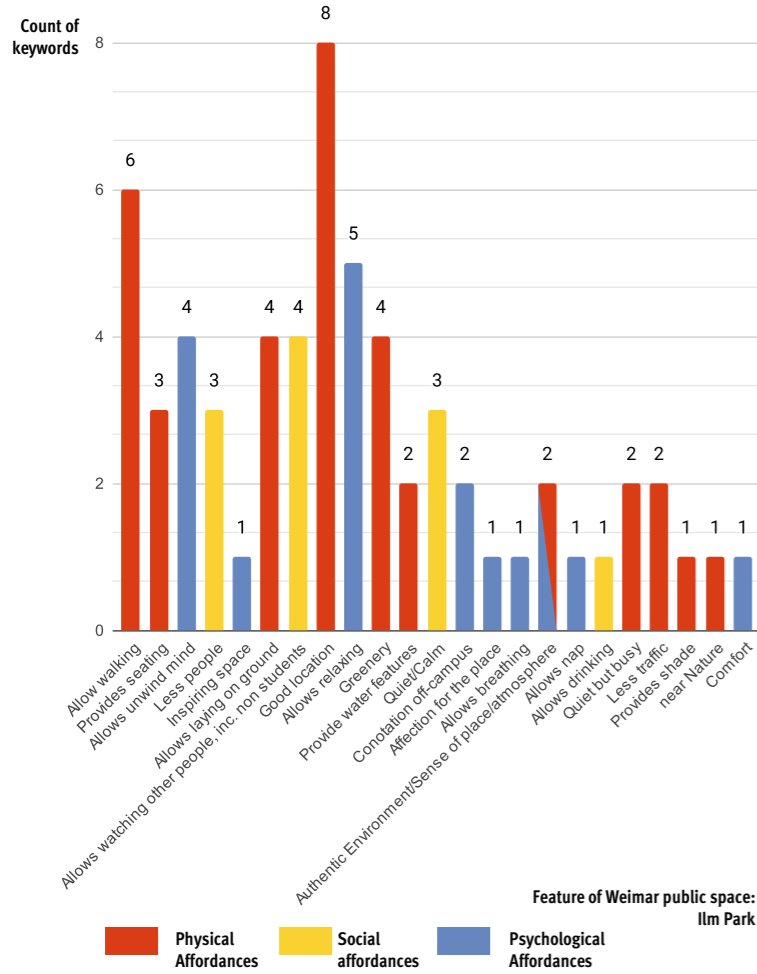


Figure 51. Reasons (keyword counting) for students when electing the Ilm Park as allowing for contemplation and reflection, classified by nature of affordance. Source: Author, 2021.

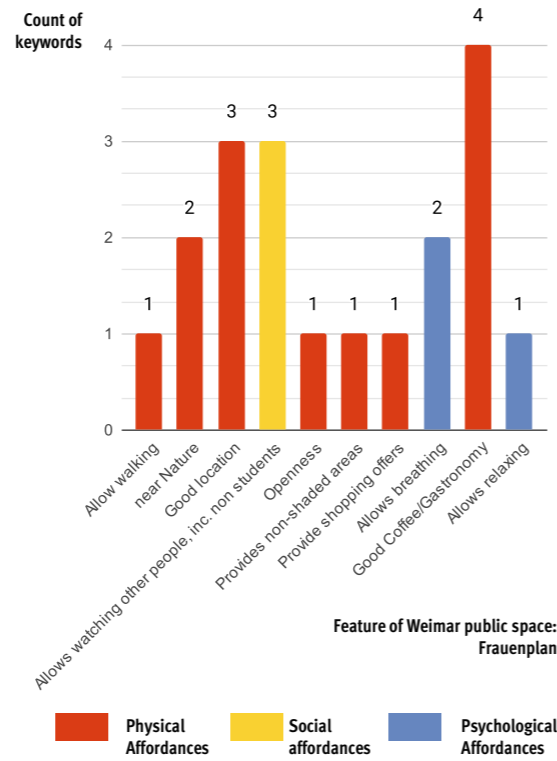


Figure 52. Reasons (keyword counting) for students when electing Frauenplan as allowing for contemplation and reflection, classified by nature of affordance. Source: Author, 2021.

By taking the student's experience as the direction of the analysis, the next graph analysed the student perception for the system of spaces formed by both the BUW campus spaces and the public spaces of Weimar, Figure 53. In this graph it can be noticed that the overall

spatial qualities of the place still are the most important affordance for the contemplation and reflection behavior, and the main spatial features were: having gastronomy options, convenient location, seating and greenery.

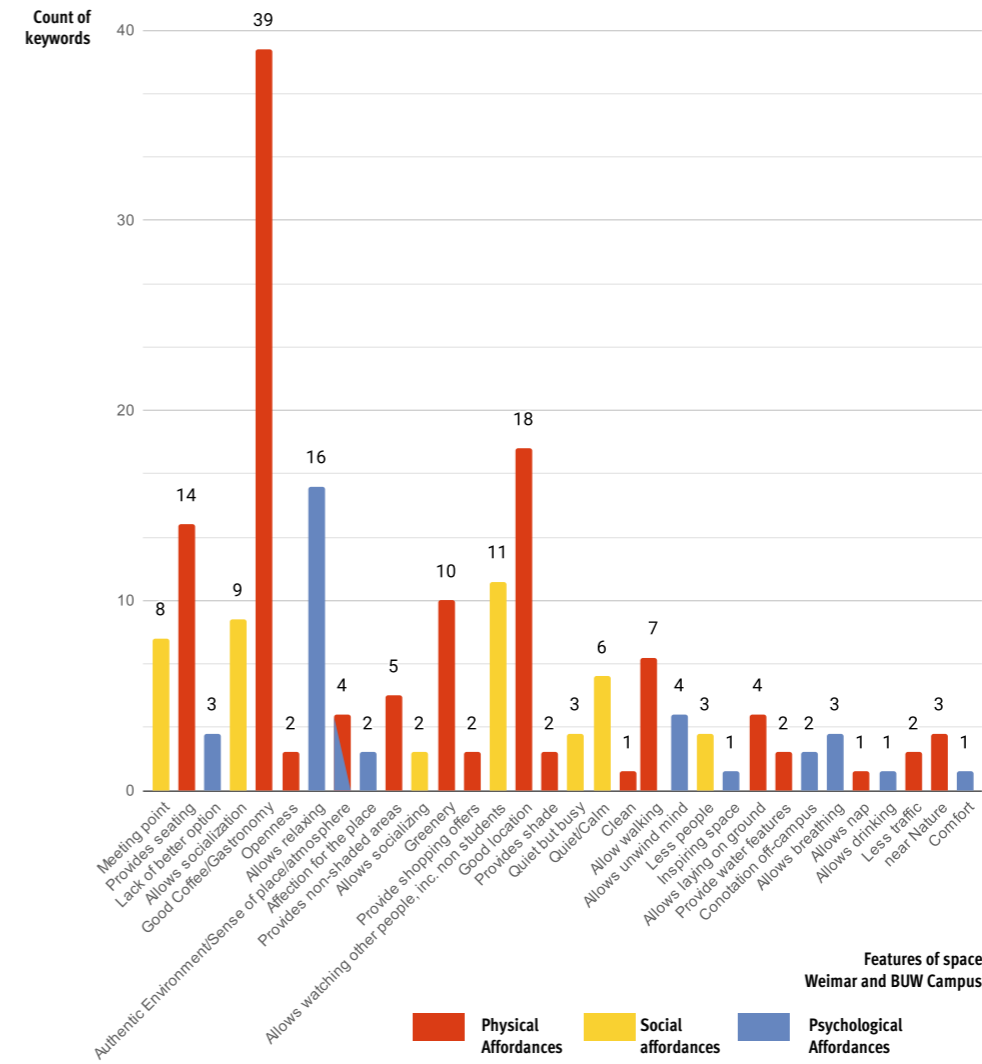


Figure 53. Reasons (keyword counting) for students when electing open spaces as allowing for contemplation and reflection, classified by nature of affordance. Source: Author, 2021.

Overlapping Results and Preliminary discussion

The previous questions detailed the student's spatial preferences for the different aspects related towards creative behavior, the frequent and diverse encounters, informal collaboration and contemplation. Every question had its particular differences, still, the overlapping of these preferences can inform about the overall places that support creativity in its complex physical, social and psychological association, as can be observed in the following map, Figure 55.

According to the statistics (see Fig. 54), the choice of students for different aspects associated with the creative behavior was more associated with the campus spaces than with the public spaces of Weimar (63% and 37% of the points respectively). The most appointed places for all questions were the M18 and Main building square, Cafe atelier square, Library square and the Mensa open space. Considering the public spaces, the main highlight was for Ilm Park that counted almost half of the city student references, especially with the results of question 4B.

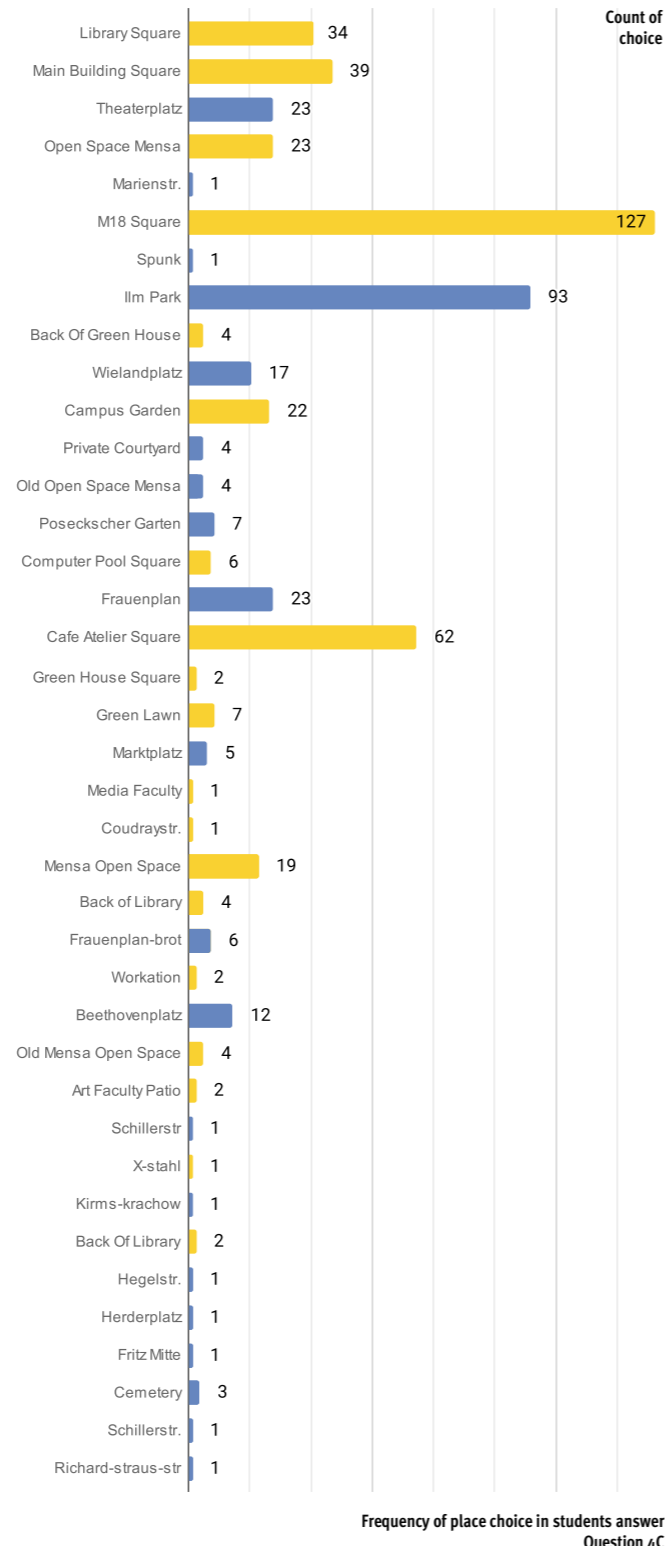


Figure 54. Frequency of place choice in students answer - Question 4A,B and C combined. Source: Author, 2021.

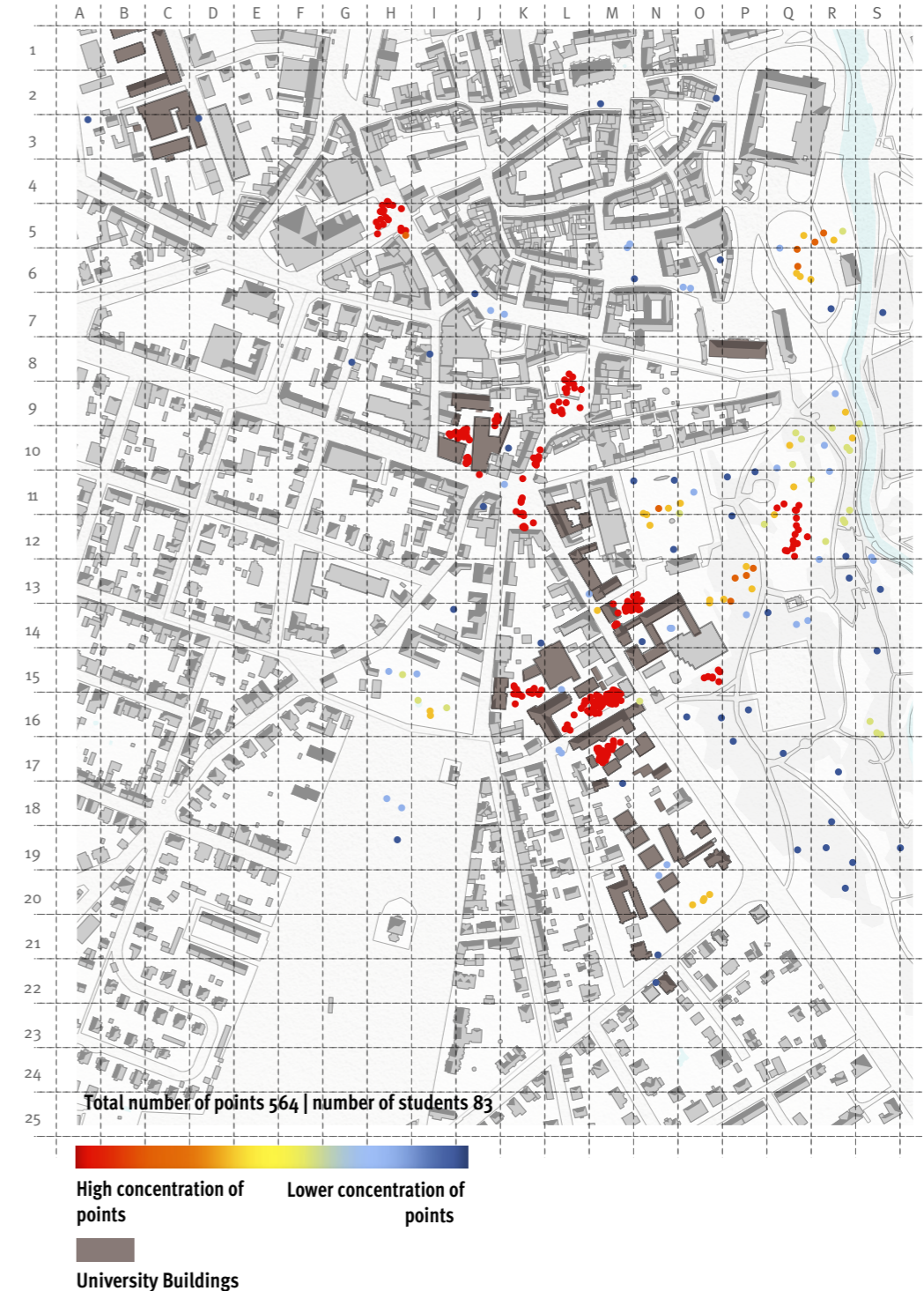


Figure 55. Students' overlapping answers for question 4A, 4B and 4C, regarding diverse and frequent encounters, informal collaboration and contemplation/reflection. Source: Author, 2021.

From the student experience evaluated, the physical features were a determinant element for all the questions and associated behaviours, above the social and the psychological features. This finding demonstrates the potential for the investigation regarding such spatial features. Looking in detail on the physical features appointed by the students for the spaces of the campus, the most appointed were: provision of gastronomy options (with detail for affordability and coffee), seating and furniture (with remarks for movable furniture), proximity to greenery and natural landscape, relevant location and accessibility, being a space shared by different disciplines and provision of shading (Fig. 56).

On the qualitative factor of the answers, it is important to recall that the character of the user response followed a pattern of answering about the opportunities they find in the place to feel or act in a certain way, and such references are not necessarily the objective feature of the space, but how the users perceive it. This fact also assists in describing a recurring reference from the students towards a space with a certain "atmosphere", this characteristic was appointed in spaces that had a high number of references towards all social, psychological and physical features.

Another consideration is that even though the nature of the narrative question linked "Where" as a spatial precondition linked to the spatial features, still in this research the user response on the open question "why?" appointed more detail about physical space as their main motivation for the combination of the different behaviours. This fact shows a degree in which the student would be more willing to link the specific behavior towards the space, which challenges previous bias that gives physical space the only role as the background of a given behavior.

The size of the sample for this questionnaire was rather limited, especially because on their descriptions, students tend to describe the situation of their choice, not precisely their reasons - mostly because they do their choice unconsciously and even unintentionally. Accordingly, it would be necessary to reach a larger number of participants to develop further and more precise conclusions, not necessarily for the point locations, where the trends were clearly defined, instead for qualitative, non-descriptive context of place preference.

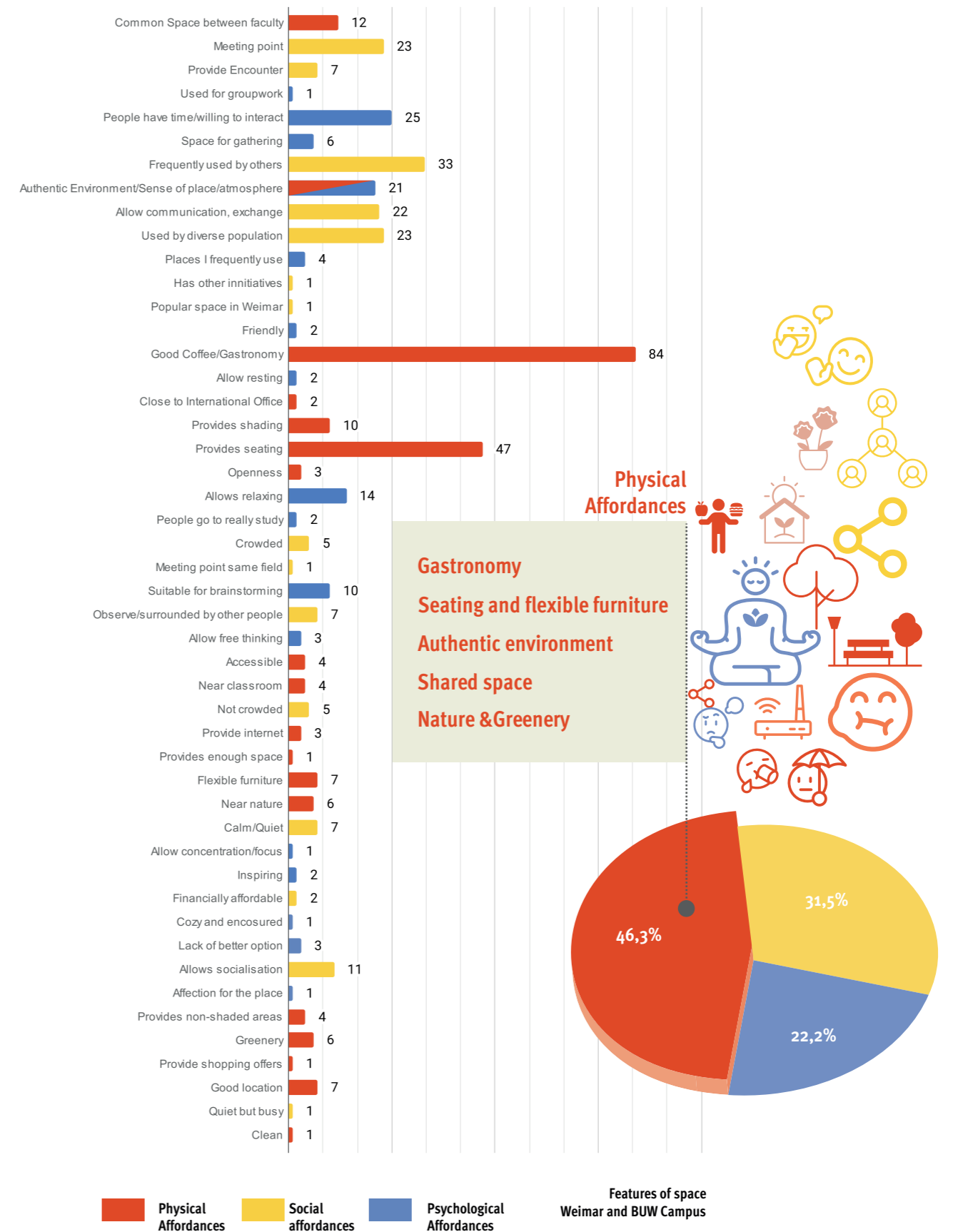


Figure 56. Reasons (keyword counting) for students when electing campus spaces (M18 and Main building square, Cafe atelier square, open space Mensa, Library square and Campus garden) as allowing for diverse and frequent encounters, informal collaboration and contemplation and reflection, classified by nature of affordance. Source: Author, icons thenounproject, 2021.

5.3. Spatial affordances: Urban analysis

The goal of this chapter is to evaluate the features of space previously associated with providing affordances for the creative behavior, as previously mentioned in chapters 2, 3 and following the strategy appointed in Chapter 4. Such evaluation is the basis to have an objective look at the study area of Bauhaus University Weimarcampus, considering the user experience.

Street network and accessibility: weighted betweenness centrality

The urban form has been one of the focuses in urban research, and Bill Hillier, was a precursor of this understanding of the urban space, with the space syntax. In his study he affirmed that “movement in the urban grid is, all other things being equal, generated by the configuration of the grid itself” (Hillier, 1996, p.41), which supports that aspects such as the geometry of street network would define the relationship between people and the different parts of a city, moreover, the complete system of the city would affect in its parts.

Furthermore, the author extends the importance of the urban form, as “the influence of the fundamental grid-movement relation is so pervasive that cities are conceptualized here as *“movement economies” in which the structuring of movement by the grid leads, through multiplier effects, to dense patterns of mixed-use encounter that characterize the spatially successful city.*” (Hillier, 1996, p.41).

In addition, according to this theory, there would be areas more privileged than others in terms of geometric potential for generating

encounters, or attracting people. One of the parameters used by space syntax to assess this theory, and previously presented by Freeman (1977) for social metrics, is betweenness centrality applied to street network analysis.

Such calculation considers the geometric configuration of points and nodes “a point in a communication network is central to the extent that it falls on the shortest path between pairs of other points” (Freeman, 1977, p.35), in the analogy to streets some streets would attract more movement in the whole network, by being the shortest path, which is especially used for predicting the behavior of pedestrians, for example in the research by Bielik et al. (2018).

This understanding of the potential of street networks was one of the physical features taken into account as an influence on the user experience of the campus space, considering that previous studies have linked network accessibility as a factor impacting behavior even inside buildings, or for entire campus complexes (Fayard, 2007, Sailor, 2014 and Soares et al. 2020).

However, on the questionnaire for campus analysis, very few students have appointed their commuting distances or choices, their references instead went towards the uses they associated with convenience, for example, being close to classrooms, colleagues or gastronomy options.

Questions of Map A and B were, by the hypotheses, predicted to have more correlation with the street network accessibility measured, so in the following analysis (Fig. 57) there is a comparison between the student's answer in Map A and B and the betweenness centrality, in a radius of 400m (5min walk).

It can be observed that by such street network analysis, the preferred path choices for pedestrians would be near the historic center of Weimar, where the betweenness values were higher due to its geometric condition. Nevertheless, student's choices were not higher near the high betweenness centrality paths, except by their choices on the Ilm Park (gridcell Q11, Q12) and Theaterplatz (H5), and Frauenplan (L8,L9,K10) .

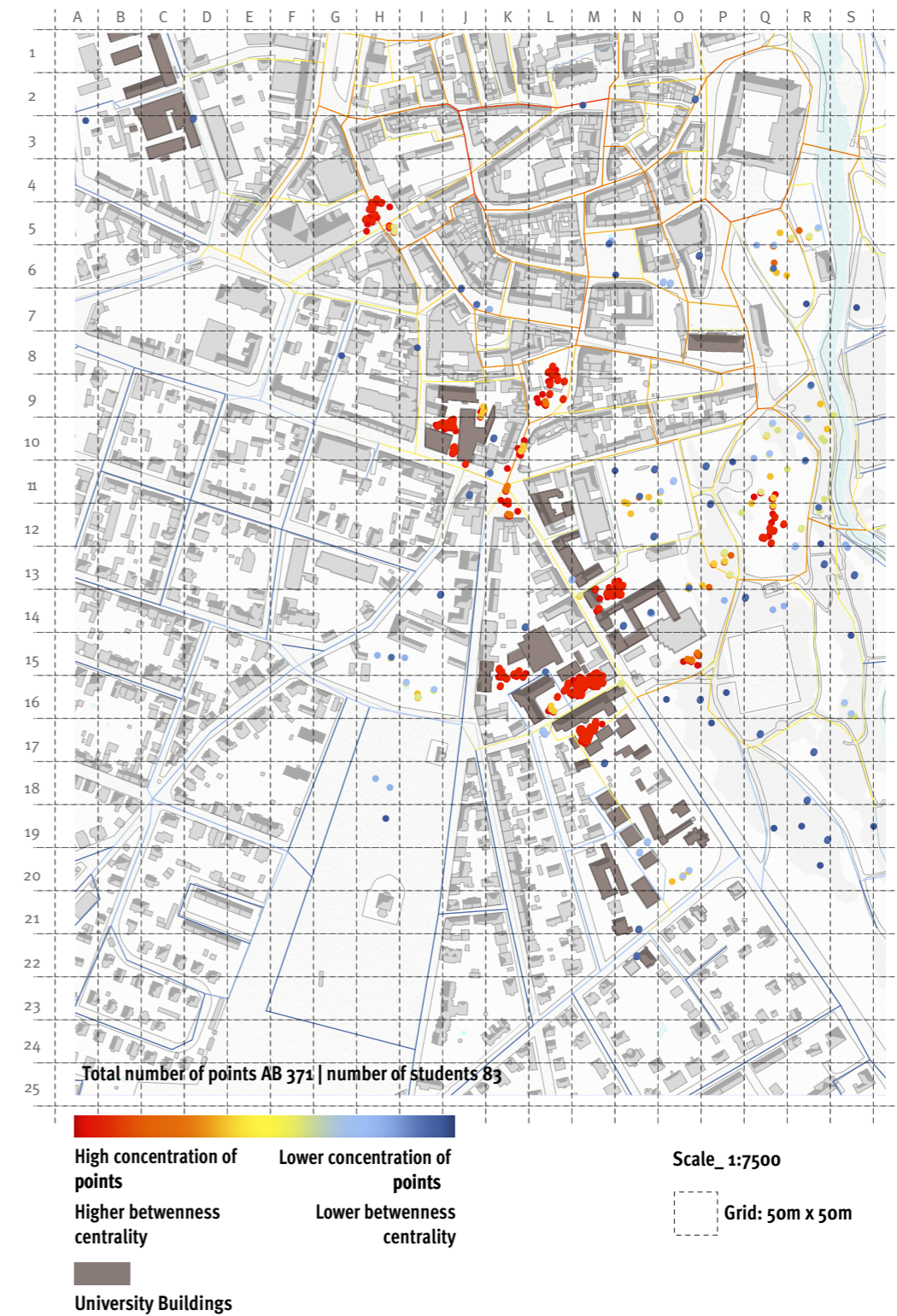


Figure 57. Students' overlapping answers for question 4A and 4B, regarding diverse and frequent encounters, informal collaboration, and betweenness centrality (r=400m). Source: Author, 2021, using Decoding spaces toolbox for Grasshopper.

Integration Educational and Urban Fabric

Previous research has confirmed the close relationship evidenced by the need of amenities in campus and their vicinity in the urban fabric (A. Den Heijer, 2011). For instance, “development in universities strategies has shown that the university is increasingly becoming dependent on the presence of non-academic space types in the near vicinity.”(Den Heijer & Magdaniel, 2012, p. 287). Such space types are retail and leisure; related business and residential functions which require a mix could be supplied on campus as well.

Considering this background, it was expected that when seeking diverse and frequent encounters, related to hypothesis and respective Map A, students would refer to the integration of the inner-city campus, by choosing public open spaces. Such premise was not confirmed since students preferred mostly the University campus spaces, as it was observed in chapter 5.1.6. When closely analysing such conditions, there

is another variant that correlates with the students choice. The main appointed feature for this question was “space shared between several faculties”, which considers that students possibly associated diversity to the field of study diversity, therefore being attracted to campus spaces.

If the betweenness centrality parameter mentioned in previous analysis is weighted by a factor linked to the land use, in this case educational, the relation between the pedestrian movement, land-use and student preference becomes more aligned as it can be seen on Fig. 58.

This map considers not the shortest path from every segment in the system, or all destinations in the inner city campus map, but movement weighted towards specific land-uses, in this case educational, which represents student’s movement preferences. Therefore, students were more impacted by the land-use than street network geometry.

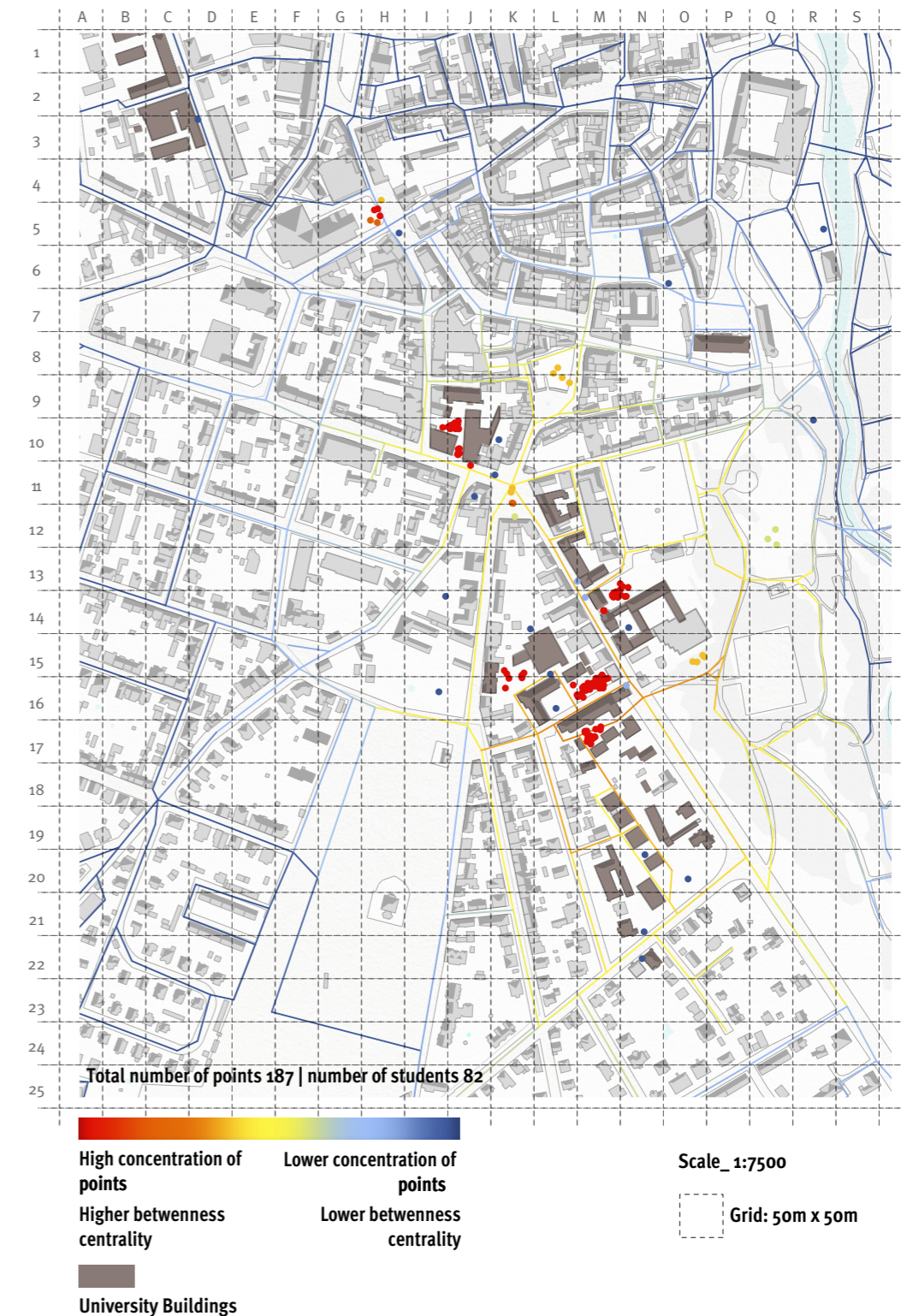


Figure 58. Students' overlapping answers for question 4A and 4B, regarding diverse and frequent encounters, informal collaboration, and betweenness centrality weighted by educational land use. Source: Author, 2021, using Weimar base map and Grasshopper definition by Bielik, M.

Access to third places, Gastronomy

Similar to the previous chapter, the next evaluation is the street network analysis linked to land-use, regarding gastronomy offers. Having food and drink available was appointed by students as relevant affordances for all three questions in Maps A, B and C. However, for B and C, this was the most chosen feature, being therefore one of the main physical assets for informal collaboration and contemplation/reflection.

This was expected since gastronomy related offers, such as restaurants and specially the coffee shops offer what researchers such as Oldenburg would call “third places”(PPS, 2008), the type of space which users feel comfortable in between the domestic and private domain of home, and the compromise of work, or in this case, study. The gastronomy scene in inner-city campus in this case offers the casual motivation for the encounters, can possibly host the informal collaboration and be an escape from university duties.

On the following map (Fig. 59) it can be observed the street network movement weighted by

such use. Still, it can be observed that the highest values for the betweenness centrality are associated with the urban form of the street network on Weimar’s historic inner city centre, and where most of the restaurants are located - however, again not coinciding with the student preference.

In this way, it recalls that the student preference is not necessarily informed by the accessibility to the gastronomy offers in Weimar (which in this area targets at tourists and other groups), rather to the affordable or socially more engaging options in the campus: Cafe Atelier (grid M17), M18 and s140 cafe (grid M16) and open space Mensa (corner of grid M14/N13). Therefore, the land-use is a physical affordance associated with the socioeconomic factor of the retail offer.

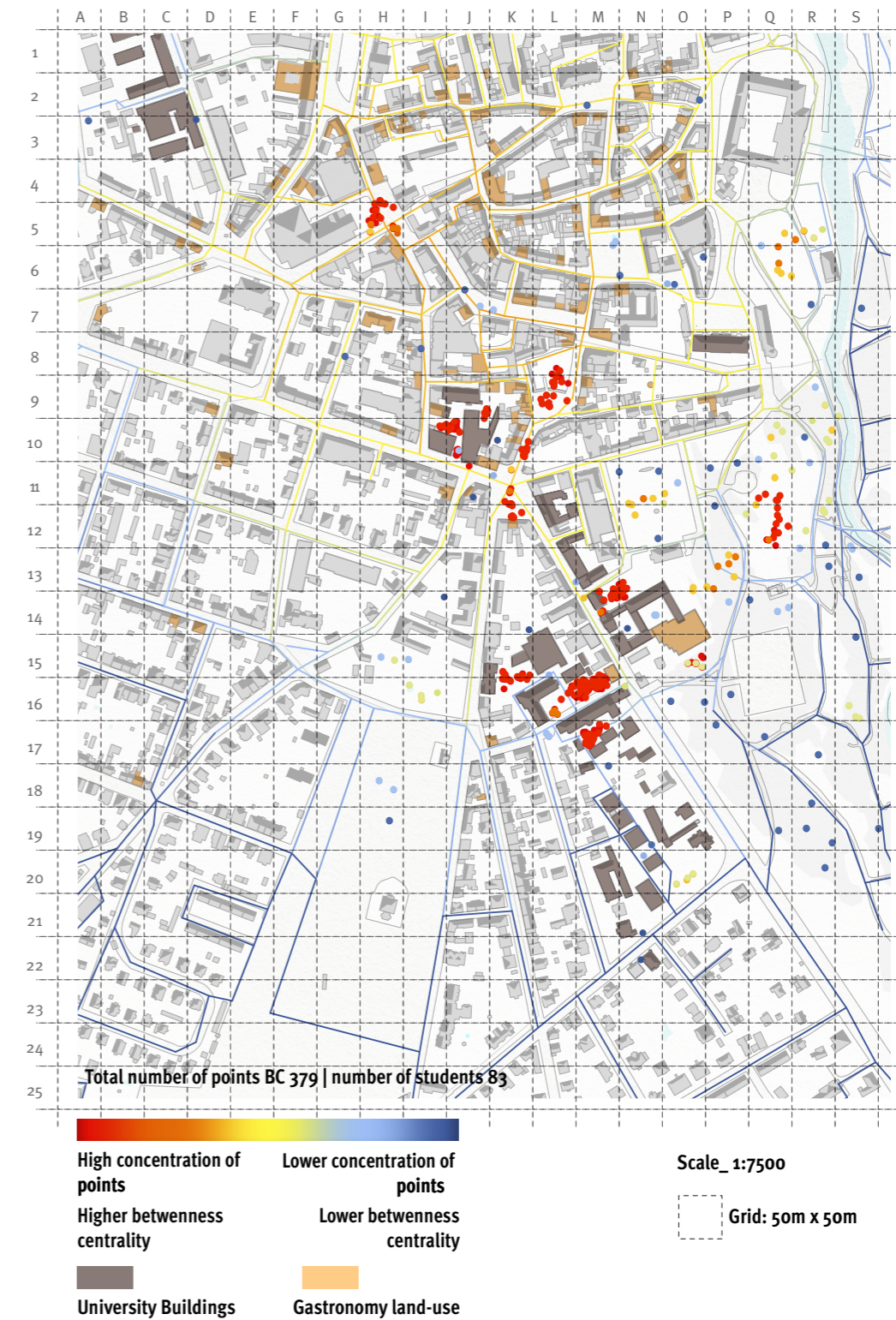


Figure 59. Students’ overlapping answers for question 4B and 4C, regarding informal collaboration and reflection, and betweenness centrality, weighted by gastronomy related land uses. Source: Author, 2021, using Weimar base map and Grasshopper definition by Bielik, M.

Amenities in open space

For the BUW campus analysis, it was observed that many students appointed amenities such as seating, shading and green areas as their infrastructure and motivation to spend time on the campus open spaces linked to specific aspects of the creative behaviour.

Seating

For the seating, it is possible to observe that the highly appointed areas were clearly linked to the availability of this element both by the quantitative and qualitative answers of Map B (informal collaboration) and Map A (frequent and diverse encounters), and Map C (contemplation and reflection) with more relevance appointed for the Map B. Such analysis can be observed on the Fig. xx., especially near cells of the campus M18 and Main building (L16, M16), Cafe atelier square (M17), Campus garden (K15, K16) and even near the deactivated Mensa facility building (O15). Still, many areas lack such elements and count with higher user evaluation, for example, near open space Mensa (cross of M14, N13), the Library (J11), which indicates that users preferred to use this space regardless of the availability of the seating, or have it on a non-formal setting, since the map contains information only on fixed benches and not other types of seating. In addition, the same relation is established for the complementary public urban spaces of Weimar highly evaluated by the students, with seating available at Theaterplatz (H5), Frauenplan (L8, L9 and K10). Also some places count with high student appointments without the fixed seating, for example on the field at Ilm Park (Q11, Q12) as it was described by the

In the following sections, the physical features mentioned by the target group of the case study were mapped and compared to the corresponding map questions, in order to test the respective hypothesis.

students that chose the location exactly not for seating on benches, instead laying on the ground.

The relation between the fixed seating is correlated to the student's perception of the opportunities of use for the space, since they described needing the chance to adapt the space for their needs, as it was mentioned by some participants on the informal collaboration (Map B). Moreover, such findings relate to the creative behaviour the previous research on the general user preferences towards public spaces, that stated "sitting space, to be sure, is only one of the many variables, and, without a control citation as a measure, one cannot be sure of cause and effect. But sitting space is most certainly prerequisite. The most attractive fountains, the most striking designs cannot induce people to come and sit if there is no place to sit" (Whyte, 1980, p.28).

Furthermore, on the role of flexible furniture, the approach mentioned by Whyte on urban squares aligns with the informal collaboration aspect of the creative behavior, when students would mention this type of furniture when arranging space according to their need, "With so much space around, fixed seat groupings have a manipulative cuteness to them. The designer is saying, now you can sit right

here and you sit there. People balk. In some instances, they wrench the seats from their moorings. Where there is a choice between fixed seats and other kinds of seating, it is the other that people choose". (Whyte, 1980, p.36).

Such fact might be related presence of such features on the cell M16 of M18 cafe and Main building square, the most rated space for such behaviour.

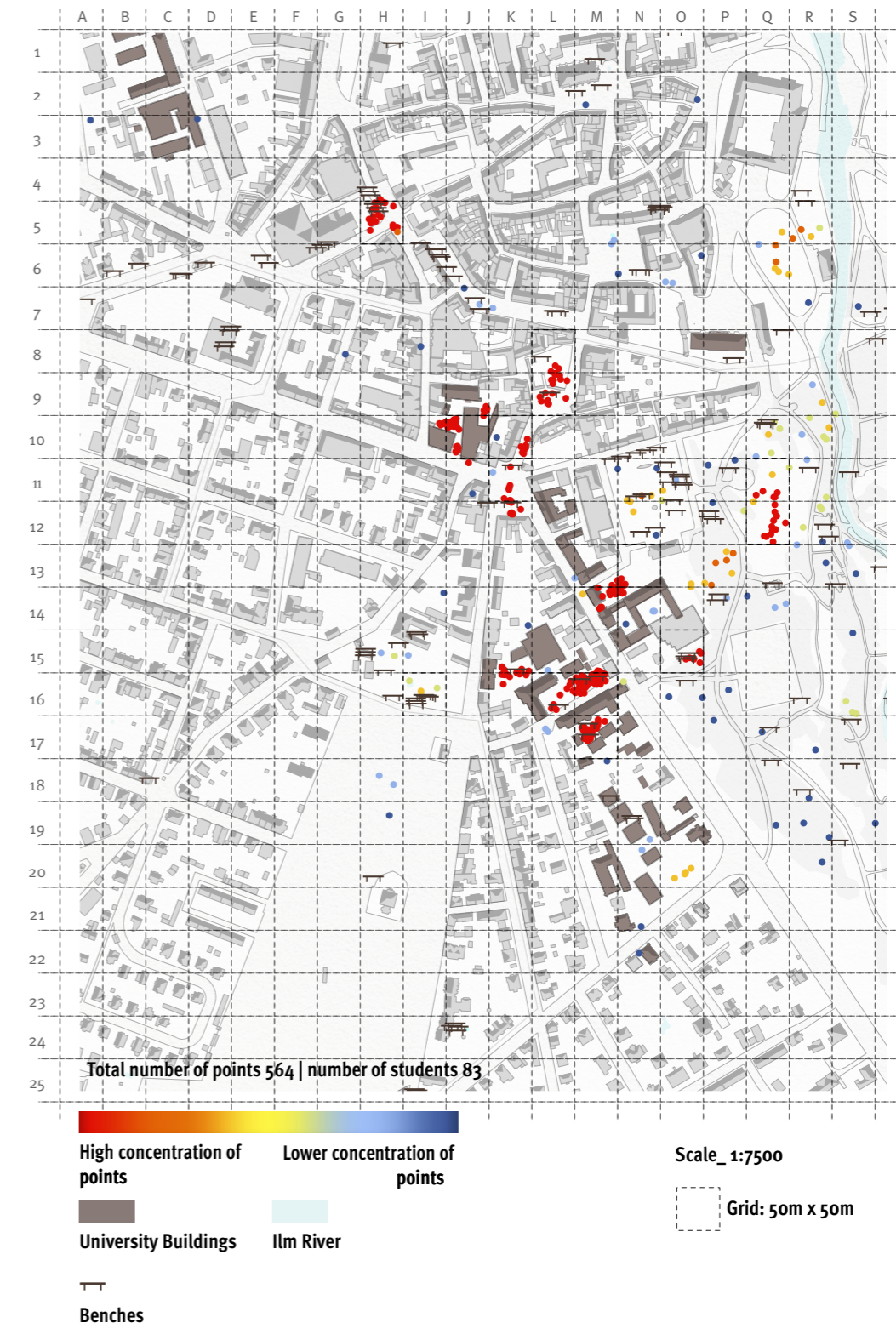


Figure 60. User place preferences to questions 4A, 4B and 4C overlaid with fixed benches. Source: Author, basemap from OpenStreetMap processed in QGIS, 2021.

Water features, trees and greenery

The features related to natural landscapes such as greenery, trees and water have been long correlated to the psychological condition of relaxation and contemplation, as seen in chapter 2. However, for this case study the availability of these features, especially greenery and trees, was commonly mentioned in the student's answer to question 4B, which asked about places for informal collaboration and was only the third most recalled feature in question 4C, which asked specifically about contemplation.

At the campus, trees were associated with shade and the microclimate comfort, especially near M18 and Main building square. In addition, answers were largely associated with the presence of the Ilm park and its convenient location providing a detachment from the university environment.

The presence of the water features was appointed previously in this research (question 3) when students related their general creative spaces, in answers which associated creativity with water noises, for example. At the urban scale of the campus, however, this element was mentioned only twice in the data set of qualitative answers for all questions (207 answers), configuring it as less relevant for this specific context of creative behaviour and target group. This can be observed in Fig.61, where the location of the water features is not linked to the most preferred places, with the exception of Frauenplan (L8,L9).

The convenient access to the green areas was mentioned by students as a strong physical feature in question 4C, especially connecting the campus to the Ilm park. In the surrounding context, Weimar provides high levels of

access to green areas when compared to European levels, with indicators according to the research by Poelman et al.(2016), only 6.5% of its population has not green areas in their neighbourhood, in addition, according to Grunewald et.al (2017), the space provision per inhabitant related to total amount of urban space is also above national average, in a study that correlated green areas indicators and recreation.

This background configures the city with enough provision of green areas, however, when analysing the campus spaces of BUW it is possible to notice a lack of green spaces. Childs (2006, p.128) established a radius by which a person would be willing to walk a daily errand to a "civic room", i.e. courtyards, forecourts and squares, by 500ft (based on American parameters, approx. 147m).

When applying such a radius to the lecture and faculty buildings (catchment in pink fill and buildings pink outline, Fig. 61) it is possible to observe which green areas would be at this distance, with only two main locations for trees: M18 cafe and Main building (L16, M16), Cafe atelier square (M17).

Spatially, the most rated spaces for questions 4B and 4C, and the most chosen for 4C (Ilm Park) are remarkably the only areas that count with trees nearby, which indicates that this feature is a strong component for supporting specific elements of creative behavior in this study. In addition, the trees were frequently mentioned by students when describing these spaces, fact that links the green areas to the qualitative "pleasant atmosphere" of the most appointed places.

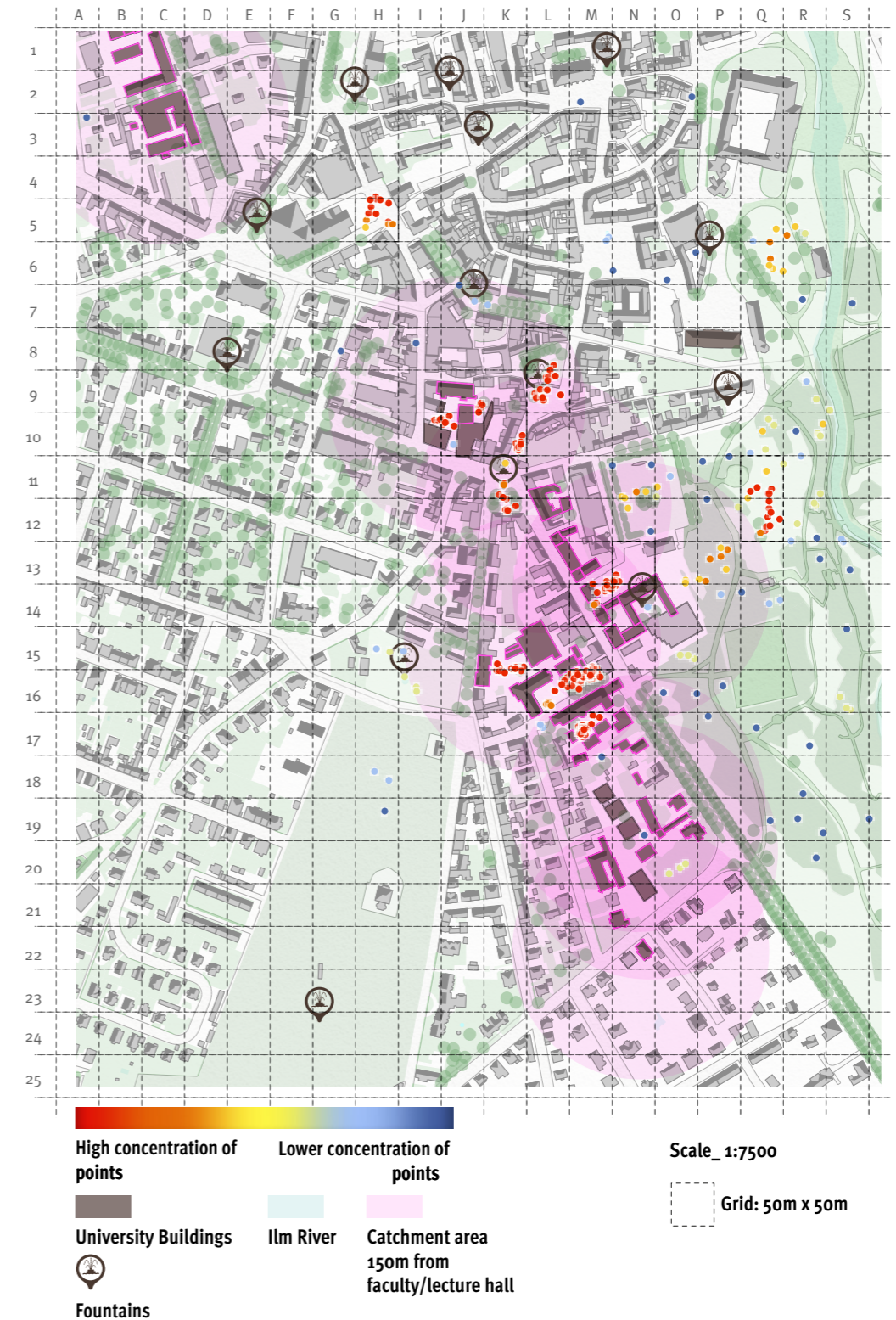


Figure 61. User place preferences to questions 4B and 4C overlaid with greenery and trees. Source: Author, basemap from OpenStreetMap processed in QGIS, 2021.

Ethnographic study: TESS Observational Study

The last part of this study is the observation of student's behavior on the key spaces appointed by them, by doing so, it addresses features of space and behavior, which were not visible from the study at urban scale or considered subjective from the questionnaire. To develop this section, the theory by previous research on the ethnographic study in urban space assisted on developing the framework.

Low (2017) has established literature in understanding the culture of a place, and how the social environment is expressed on space, in this regard, she states that "By "spatialize" I mean to produce and locate - physically, historically, affectively and discursively - social relations, institutions, representations and practices in space. "Culture" in this context refers to the multiple and contingent forms of knowledge, power and symbolism that comprise human and nonhuman interactions; material and technological processes; cognitive process, including thoughts, beliefs, imaginings and perceptions" (Low, 2017, p.7).

This quotation shows the relevance of having a multidisciplinary look at the study object, in this case, the creative behavior. The method to perform the observations is the TESS "Toolkit for the Ethnographic study of space" by Low, Simpson and Scheld (2018). In this publication, the author provides the methodology for observing individuals through behavioral maps, the main tool used in this study of campus space. It consists of timed observation of a space, recording on maps how people move on the space, direction, speed and also how stationary users of space behave and interact with other people.

Strong limitations affected the performance of the observational study, since it was performed on the same extraordinary circumstances of the covid-19 pandemic as the questionnaire, and also at the end of semester. The chosen places for performing the observation were spaces perceived as the main spots of the campus and commonly appointed by students while the results of the questionnaire were being processed. Therefore, this section of the study seeks to present the portrait of how the relationships between user and space take place on the specific locations, and including other aspects not presented by previous analysis.

M18 and Main Building Square

This space was the most appointed space for different aspects of creative behavior related activities by students in all three questions, 4A, 4B and 4C. It is a key destination for the students, since its location is central on the campus and it hosts the M18 building (with several students initiatives for example the coffee shop s140, shop kontor&stift and student association Stuko), the historical site Main Building (Architecture and Urbanism Faculty) by Walter Gropius, the International Office and the Art and Design faculty building by Van der Velde. This configuration defines a place which is both a central space for the student community and a tourist destination.

The observation study took place in rounds of 30 minutes in three different times, morning and afternoon of 30.07.2021 and evening of 20.08.2021, represented by Fig. 62 and 63 (next page).

In all observations it was possible to observe a high traffic of pedestrians on the path in front of the Main Building, including cyclists, tourists and other demographic groups not grasped by the questionnaire, which defines this area as an important link in the city of Weimar.

When observing this specific period and on other situations, it was possible to identify that most students relate to the M18 building due to its attractive use for this public, moreover, even that the pandemic situation had the building closed, the point of connection became then the window from which the students operate the coffee shop.

On the two observations near this building, students preferred occupying the informal seating options under the trees, using the floor or movable furniture rather than the formal seating. On the afternoon observation,

even with the coffee shop closed, there was a diverse group of people (diverse gender, age, with disability) using the space with their own beverages, and working on laptops, reading, in positions not ergonomically comfortable, apparently compensated by the setting.

The passing by people also related to this corner of the square, looking at others activity, especially small groups of older people and tourists. Students pass by and interact with the ones staying at the space which confirms the space as a place for unintended encounters between peers.

In the evening at the same location (Fig.63, next page), students still gathered around the window, talking in small groups, in which it was possible to observe diverse cultural backgrounds in their languages. Also, in all observations it was observed physical traces of user highly used areas within the square, for example, in fuller trash bins, cigarette bins and empty bottles which indicates also the type of space appropriation.

On the other side of the square, the green lawn was observed in the morning, Fig. 62. This area was not as used as the opposite side, and when used also people preferred using the floor and movable furniture instead of the formal seating provided. People walk and move around the lawn with just few actually seating on the lawn, which is a low use considering that it was observed in an optimal summer weather. While ending the observation session also groups of tourists were observed at the central portion of the square, which then shows three different character and spatial configuration of the space: the eastern occupied by students, with the furniture and shading of trees, the middle where the main building attracts the group of tourists and the lawn which is more of a circulation area.

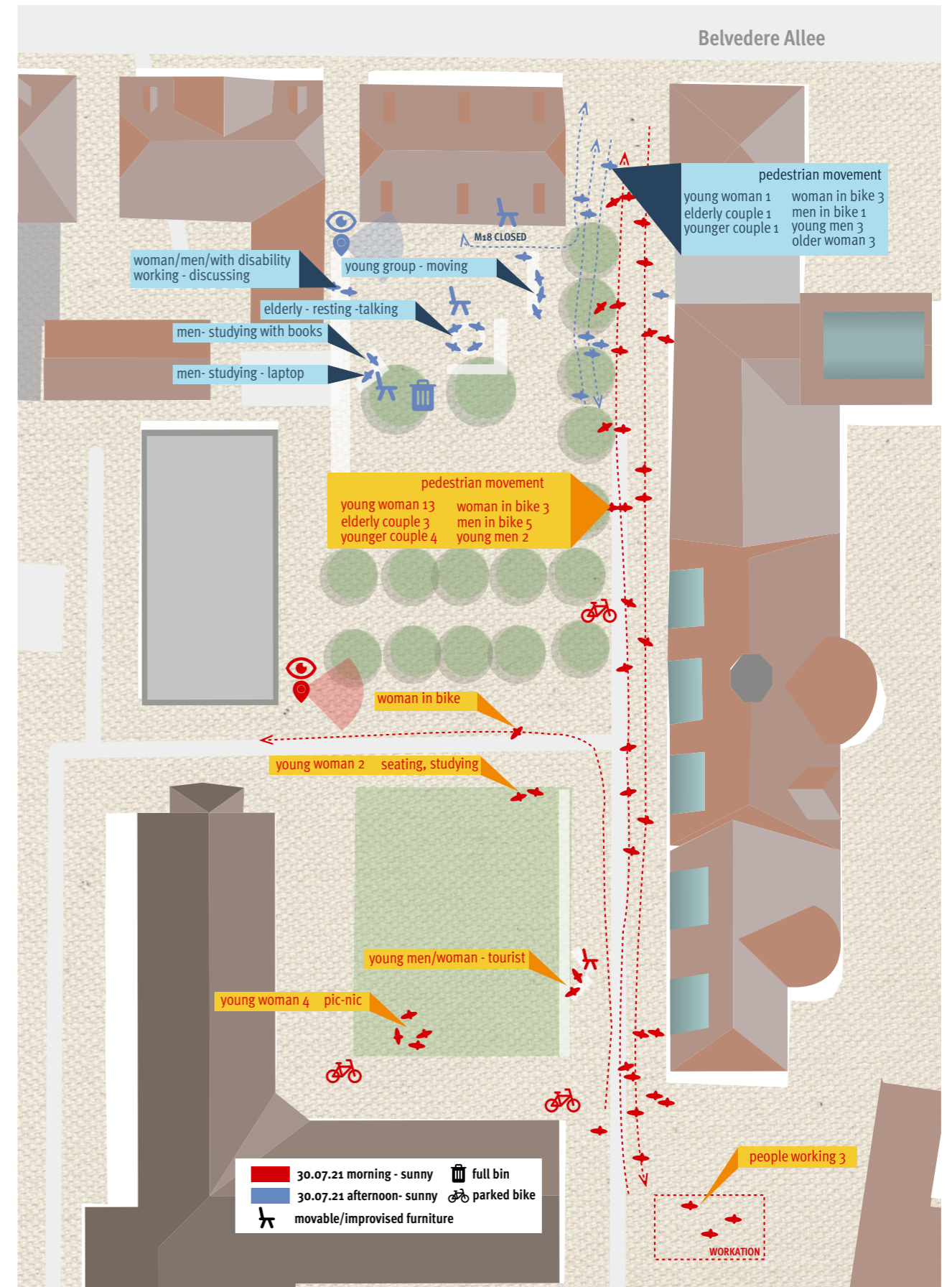


Figure 62. Behavioral map observational study, based on field observation (originals available at digital files of thesis), on morning and afternoon 30.07.2021. Source: Author, 2021.

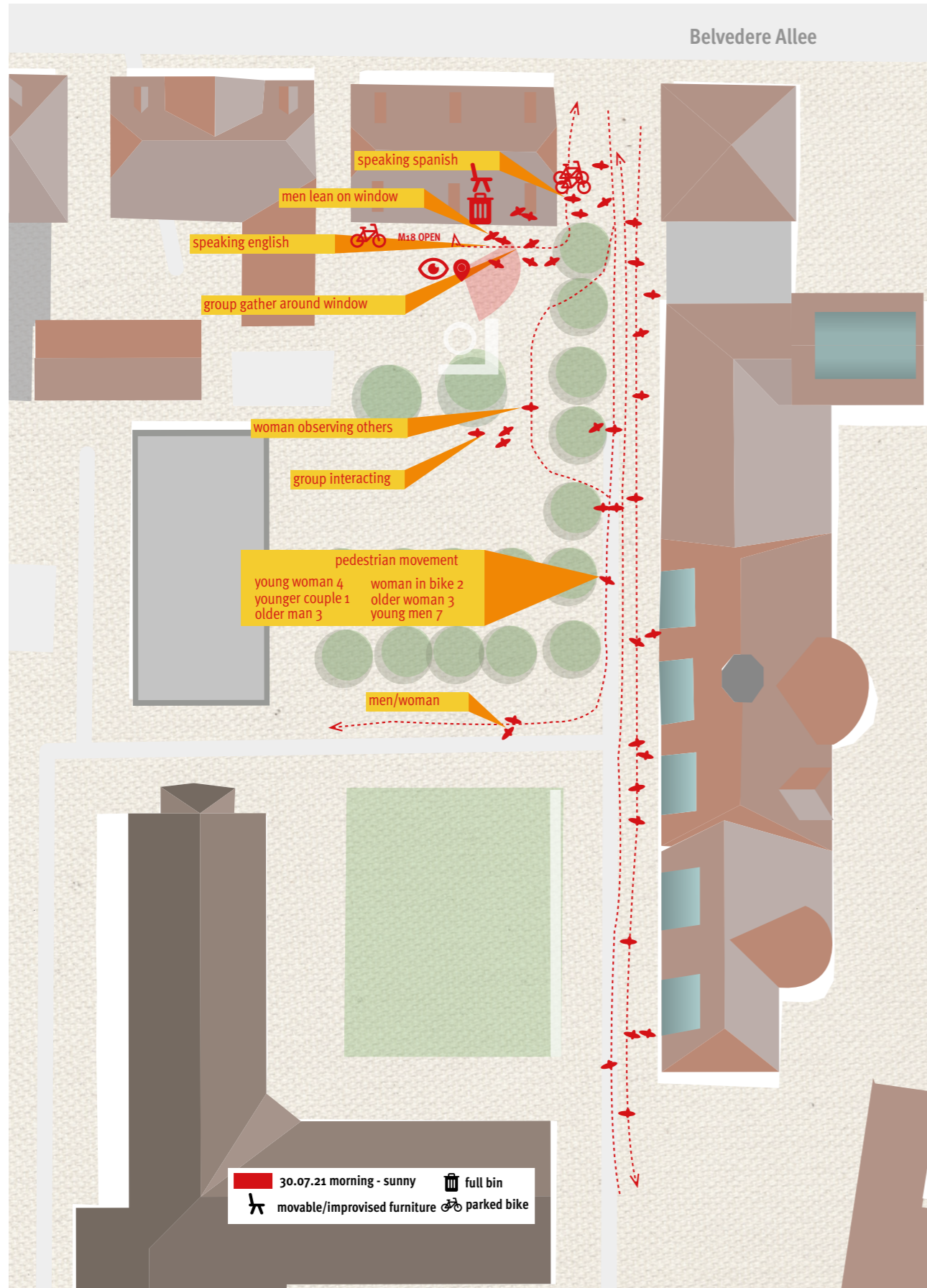


Figure 63. Behavioral map observational study, based on field observation (originals available at digital files of thesis), on evening 20.08.2021. Source: Author, 2021.



Figure 64. Behavioral observational study, on afternoon 30.07.2021. Source: Author, 2021.



Figure 65. Behavioral observational study, on evening 20.08.2021. Source: Author, 2021

Cafe Atelier Square

The next space is the square of Cafe Atelier, also a space highly appointed by students on questions 4A, 4B and 4C. This space was observed in the afternoon of 29.07.2021. At this space, the character is more reserved than the area at the M18 and Main Building.

The square is formed by the coffee shop, the architecture workshop, the back of the Main building (Architecture and Urbanism faculty), the computer laboratory and another building from the Architecture faculty.

The group of people observed was mostly composed of young people, with a diversity level (diverse gender, age, different languages, with disability). This square also had the presence of kids and elderly people, who mostly used it as a temporary stop. People staying at the coffee shop used the movable chairs, and sat under

the shade of trees. The socialization process went by as people passing also stopped by several groups and had short conversations before leaving - appointing this place also for promoting informal encounters. Most people consumed from the coffee shop but people also brought their own beverages. Another sign of peoples appropriation of space was on areas with the fuller trash bins, cigarettes and painting on the floor remaining of previous events, Figure 67.

For the movement of people it was observed that they also have the main direction coming and going on the path aligned to the main building from and to Belvedere allee. Here there was a high number of pedestrians, in addition to cyclists at higher speed.



Figure 66. Observational study afternoon 29.07.2021. Source: Author, 2021.

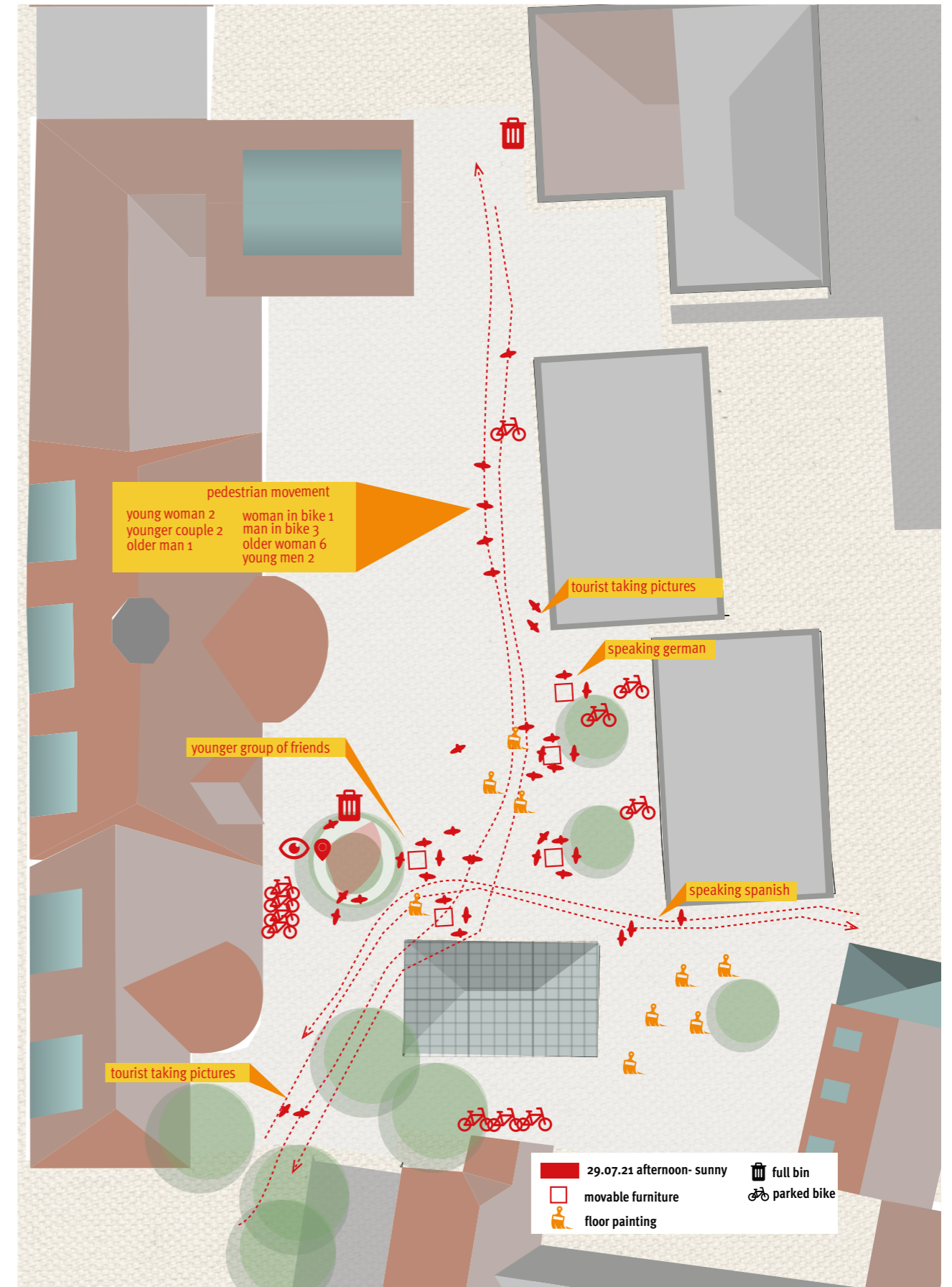


Figure 67. Behavioral map observational study, based on field observation (originals available at digital files of thesis), on afternoon 29.07.2021. Source: Author, 2021

open space at Mensa

The third space is the open space at the temporary mensa, the university cafeteria. This space is serving this facility, when the official building for this purpose has been closed for refurbishment since late 2019. This space was appointed by students as the third most chosen space for all three questions and the correlations student's made to it was strongly correlated to the provision of food. When observing this space, different from other previous locations, it was used exclusively by the student group. When observing the behavior of students, they choose their locations at the space in two main

ways, by seating on the tables provided by the facility and moving them under the shade, or seating on the floor under the trees, Fig. 70. Students sat in groups, and spent a long time interacting with each other even after eating. Here they met and interacted with the incoming students, configuring another meeting space. The particularity of this place rely on the sharp difference of occupation during the different times of the days and in weekdays and weekends. Out of the service hours, the place is completely emptied out since the attraction was only related to food. Fig. 68.



Figure 68. Open space mensa on 28.07.2021, afternoon. Source: Author, 2021.



Figure 69. Observational study, based on field observation (see appendix), on lunch break 30.07.2021. Source: Author, 2021.

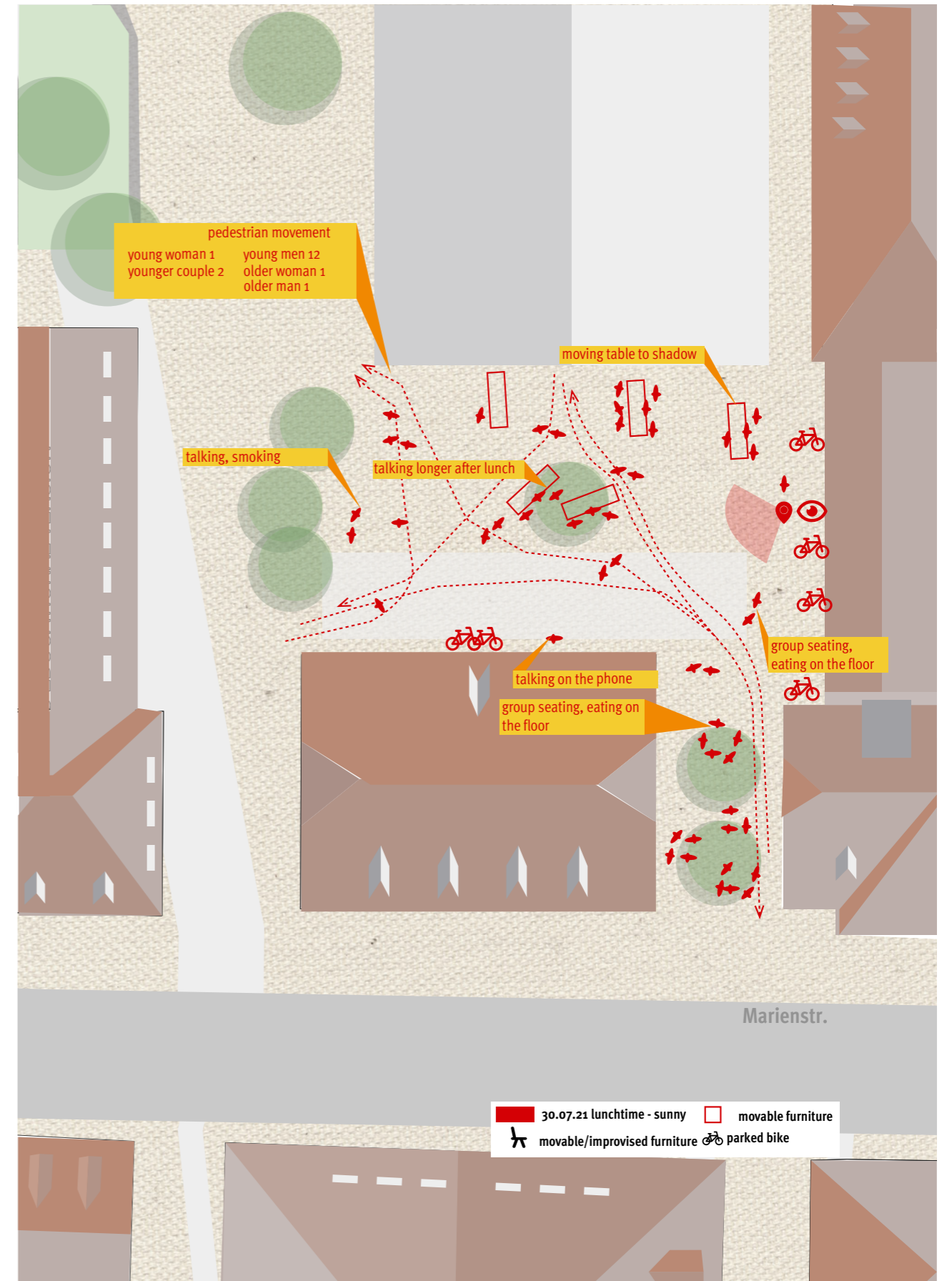


Figure 70. Behavioral map observational study, based on field observation (originals available at digital files of thesis), on lunch break 30.07.2021. Source: Author, 2021.

Library square

The last space observed in campus was the square formed by the library building and media facility SCC (Fig. 72). It was appointed by the students in all questions, but especially in question 4A on the diverse encounters. When observing this space, it configures more of a transition space, although it has many references, probably related to the building. The main observed feature attracting people are the steps between the library and Schützengasse, and as mentioned by the students, the nearby fast-food option selling fries (even trash bins nearby are a sign that these two spaces are complementing each other). By observing the spaces, there was a strong and varied flow of people on the path

going between Steubenstr. and Schützengasse (which forms a shortcut). The people using this path had different backgrounds, running errands, walking at a fast pace. The only exemption from this was one woman waiting inside the car, and two mens smoking/eating while sitting on the steps near SCC, and the incoming/outgoing flow of people towards the library entrance.

The presence of car parking on the street is also another conflicting use with this area, since it reinforces the image of the square as a transition space. There is a lack of greenery, seating and trees compared to the other spaces.



Figure 71. Behavioral map observational study, based on field observation (originals available at digital files of thesis), on lunch break 30.07.2021. Source: Author, 2021.

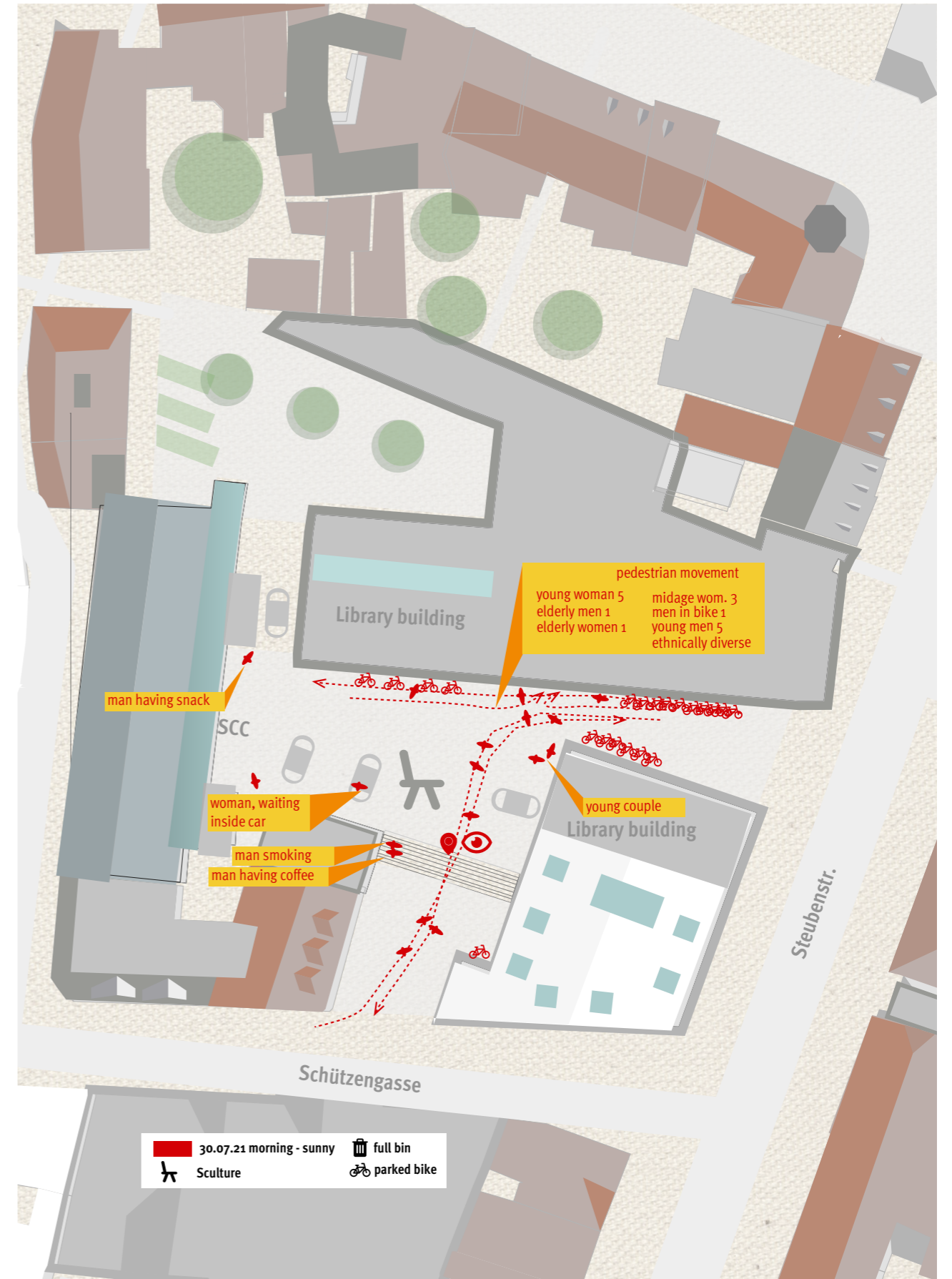


Figure 72. Behavioral map observational study, based on field observation (see appendix), on morning 30.07.2021. Source: Author, 2021.

6. Findings discussion and conclusion

The main research question of this study started as to which and to what extent the physical features of open spaces of the educational campus could influence creativity. As the research developed it was understood that the “to what extent” is a complex assessment to perform towards a psychological process that leads to creativity, and creativity itself was investigated to understand the creative behaviour. Determining the precise features which can inform creativity, is a rather limited understanding if not considering the impact of other affordances for such behavior, social and psychological. Such constraints were specially perceived in the questionnaire answers for question 3, in which participants presented a certain difficulty for linking their creative moment to space, instead they refer to their feelings or actions preceding

the creativity.

The first hypothesis related the creative behaviour to frequent diverse encounters to the most frequented spaces of the campus. Previous research (Soares et al, 2020) had correlated this effect to accessibility, street network and land-use. In this research however, it was found that from the user perspective, the most important feature was related to the chances created by the environment: the shared spaces, the amenities provided, meanwhile, also the network analysis did not correlate to the user preference places except if weighting on their preferences. This indicates that the social and psychological affordances of space created by these specific places might be more relevant than the accessibility level provided by the network.

The second hypothesis was related to informal

collaboration, and had expected by the literature a relation between this behavior and to the amenities, which was confirmed. Concluding that a space that has the physical structure in terms of providing the space for people to gather, sit and meet allows this trace of creativity. The last tested hypothesis linked the contemplation and reflection individual processes linked to recreation features of space such as green areas and water features, which later on was by the users valid for the green aspect but the main factor was actually still linked to socialization processes, for example, in the preference towards the gastronomy related uses.

As topics changed to more individual aspects of creativity, the user preference became more linked to the urban space of Weimar, referring to the infrastructure provided by the city. Students, when relating to creativity in space, did it as other users describing other general activities, in which the physical space provides the stage for their actions by having the basics: seating, support for gadgets, interacting with others, nature and more importantly a socially relevant environment for the activity they are aiming to perform.

The TESS observation studies at the spaces confirmed what was described by the students, bridging to the eye level the scale in which the user interacts with the space, and it was observed for example how the opening of the initiative at their main space (M18) changed the landscape by being crowded at times and attract users at night (even in the absence of appropriate lightning) at the same time, how the open space of library is lessening the interaction potential identified by students by not providing enough space for the permanence of students, and therefore also lessening their creativity affordance.

During the development of this research, several initiatives from the students and university community related, and informed the research directions. For example, the Workation project in which students developed a module which aims to provide in the open space the features that students need to work there and lack in other spaces of the campus, such features were again the basics: seating, tables, greenery, charging points for electronics and the concept environment that this space was provided for the student's appropriation (see interview with Workation's project leader appendix, p. 130).

On the study of Bauhaus University Weimar's campus, the choice of students for more improvised furniture, reaffirmed the role of appropriation and the overall atmosphere of the place as an appealing factor for this target group to occupy the open spaces. This sets the campus spaces not far from other typologies of public space, but recalls the role of the environment (social, physical) in implying the connection between creativity oriented mind-set and highly skilled individuals, as it was predicted from the concept of the knowledgescape and creative cluster.

It is also relevant to acknowledge that the results of this research refer to a specific context of a campus environment and a specific target group, further research would need to be conducted in order to evaluate properly if the methods applied, especially the narrative question of the questionnaire, would have impacted the user response and later on the conclusions. Moreover, other limitations brought by the time constraints, sample and analysis also raise the chance for further research on the relation between creativity and the campus spaces.

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Appendix

Temporary Creative appropriation of Space Workation



Figure 73. The workation project at BUW campus. Source: Author, 2021.

The following interview with the responsible for the “Workation” Ms Hanna Kerschefski collects more information on this project, considered one of the examples of campus appropriation at BUW.

1. Who are the people you expected to use the Workation space, and why?

We mainly expected that students and employees or self-employed people would use our work island. Since we planned to locate our Workation centrally in cities, the demographics of the users should be quite mixed.

2. How you expected the people to use and act in the Workation?

Regardless of a lack of indoor workspaces, it creates attractive workspaces on campus that have not previously existed in this form. Through its space-creating function, it becomes a social gathering place and creates a cross-faculty meeting space by connecting people at a low threshold during co-working. We were delighted to observe that Workation is being used just as we had hoped: The pavilion has been very well received since the beginning and the concept has taken off. Many students take a seat and work productively

in the Workation. They appreciate the tables, solar power, greenery and sun shades. Many students also appreciate the fact that they are protected by the space of the pavilion in the middle of the campus on the one hand and on the other hand they are in the middle of campus life and can observe the hustle and bustle on campus.

3. How did you decided which features and amenities to include in the workation?

With the intention of creating meeting places that, combined with greenery, would improve the urban climate, we conducted surveys on the street and found out that digital working outdoors is desired, but currently not perfectly possible: In the café you have to consume, on the park bench the sun is blinding, the battery fails, there is no table. As a result, we developed the vision of green work islands, which on the one hand can contribute to the green city through integrated green walls, and on the other hand represent a comfortable place for digital work, but also for exchange and meetings thanks to integrated solar systems as well as work- appropriate furniture. For digital work on campus, sun protection is essential to be able to see the screen properly. The lack of tables with seating and standing areas is one reason why digital work in the fresh air has failed so far. Biophilicdesign contributes to the good local and working atmosphere. For the use of laptops we included self-sufficient power supply through solar energy panels.

4. Why and how did you choose the place to place the Workation module?

The name “Workation” is a combination of “Work” and “Vacation” and is intended to

provide a short vacation from the indoor office. Working in the fresh air corresponds to the desire of many people to spend more time outdoors. With our work island, we want to contribute to the changing world of work and develop a module that can adapt to different locations and needs: Whether on a university or school campus, publicly in the city and in the park, or privately with entrepreneurs on their own company premises. While the office pavilion fits into the “network” [!] movement in the workplace, it meets the interests of students on campus. Due to the urgency of an outdoor working solution on campus, we decided that our prototype should be centrally located at the university.*

5. Have you considered other places?
See above.

Interview had consent of Ms Kerschefski, given via email, on 21.08.21

Sample Questionnaire

Student Campus Experience Research
Welcome to the Campus Student Experience Research!

1 Complete a brief survey to help us understand the campus better. This survey will take about 5 minutes to complete. You will receive a code that you will use to access the main survey. This code will be used to identify your responses and to ensure that you are not asked to complete the survey more than once.

2 Complete a brief survey to help us understand the campus better. This survey will take about 5 minutes to complete. You will receive a code that you will use to access the main survey. This code will be used to identify your responses and to ensure that you are not asked to complete the survey more than once.

3 Complete a brief survey to help us understand the campus better. This survey will take about 5 minutes to complete. You will receive a code that you will use to access the main survey. This code will be used to identify your responses and to ensure that you are not asked to complete the survey more than once.

4 Complete a brief survey to help us understand the campus better. This survey will take about 5 minutes to complete. You will receive a code that you will use to access the main survey. This code will be used to identify your responses and to ensure that you are not asked to complete the survey more than once.

4A Please take a moment to explore the map and identify the location of the building you are currently in. This will help us to better understand the campus layout and to ensure that we are providing the most relevant information to you.

4B Please take a moment to explore the map and identify the location of the building you are currently in. This will help us to better understand the campus layout and to ensure that we are providing the most relevant information to you.

4C Please take a moment to explore the map and identify the location of the building you are currently in. This will help us to better understand the campus layout and to ensure that we are providing the most relevant information to you.

4D Please take a moment to explore the map and identify the location of the building you are currently in. This will help us to better understand the campus layout and to ensure that we are providing the most relevant information to you.

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Figure 74. Sample of questionnaire applied in this research, for better visualisation see digital file: Author, 2021.

Statutory declaration

I hereby affirm that the Master thesis at hand is my own written work and that I have used no other sources and aids other than those indicated. All passages, which are quoted from publications or paraphrased from these sources, are indicated as such, i.e. cited, attributed.

This thesis was not submitted in the same or in a substantially similar version, not even partially, to another examination board and was not published elsewhere.

01.09.2021, Weimar



Date, Place

Signature_ Gabrielly de Souza Lima