Smart Brands and Identities: building friendly bridges between Design and Smartness

Catarina Lelis [0000-0003-4402-8876]

University of West London, London, UK
catarina.lelis@uwl.ac.uk

Abstract. When adapting an environment toward making it smarter than it is, every user is expected to develop a certain degree of design literacy to effectively contribute with and make use of relevant data. Little research has been done regarding both the expected level of users' design literacy in smart environments and the developmental tactics for these essential skills to be acquired. Simultaneously, there is little acknowledgement of the relevance of these environments' brands as important assets in supporting design literacy. This paper speculates on the relevance of investing in "smart visual identities", which configure as a meaningful and holistic branding resource. Hermeneutics informed the qualitative analysis of content in this research. Two essential dimensions of smart visual identities were identified, and a definition of "smart brand" is proposed, suggesting that highly relatable brand identities allow individuals develop their design literacy while users of a smart learning environment.

Keywords: Visual Identity; Dynamic Brands; Learning Ecosystems; Smart Brand, Smart Campus

1   Brand: the missing dimension in defining smartness

In medieval times, building bridges became pivotal for the network of land communication; bridges were so important that some included chapels to encourage bequests and gifts for their maintenance, and the church offered remission of sins to those leaving money to help build or restore local bridges. Bridges were what would keep individuals more easily and affordably connected. In medieval times and standards, bridges would have been a good example of *smartness*, considering public stake and involvement in their development.

In 2008, in a speech delivered at the Council on Foreign Relations in New York, IBM's CEO Sam Palmisano extended the concept of smartness to both the planet and the human mind [1], clearly stating that a smart ecosystem is human-centred. It can offer optimised infrastructures and customisable technology-mediated solutions, responding to active citizens' needs and big data usage, fostering adaptable and challenging learning contexts, in a bottom-up approach [2]. According to the ISO standards, smartness is "a quality of contributing to sustainable development and resilience, through soundly based decision making" implying "a holistic approach, including good governance and

adequate organisation (…) addressed in terms of performance, relevant to technologically implementable solutions" [3]. Hence, smartness is not just the intelligence of technology or a measure of a technology's adaptability [4]; in current times, smartness is a characteristic of sustainable development whilst a condition of systems in network communication that deploy data-driven analytics and algorithmic insights, allowing individuals to respond (by making necessary adjustments) to complex and dynamic circumstances [5], on the fly.

Complexity and uncertainty have been defining the way humans adapt to constant alterations, certainly relying on the abundance of available data and information for decision-making that allow life to proceed and, in many cases, for processes to be optimised and reinforced. And, according to Figueiredo, Krishnamurthy & Schroeder [6], "the basic premise seems to be quite simple: with enough data generated", environments and things around humans "will no longer simply react but will instead develop and improve models for future development and more comfortable living".

This understanding of smartness as an ecosystem's quality that, by aiming at optimisation, reduces complexity, uncertainty and, consequently inefficiency, draws on several different discourses such as ecology, economics, computer science and evolutionary biology [1]. The latter is particularly interesting in the context of this research since it encompasses the construct of "mutation" which, according to the most recent discoveries, eventually contradicting neo-Darwinian ones, is known to be a strictly regulated and potentially beneficial process, playing an essential role in the evolution of life [7]. Moreover, according to Dubberly [8], breakthroughs in biology have been mostly about information, as mapping genomes, editing DNA sequences, and mapping cell-signalling pathways. Similarly, current design practice is largely information-based: "Increasingly design shares with biology a focus on information flow, on networks of actors operating at many levels and exchanging the information needed to balance communities of systems" [8]. It is particularly interesting to note that most of the information made available to users (for them to not simply use, but also adapt, change, recreate, etc.) is conveyed through visualisation options and design processes that are inherited (as in biological systems) from the brand or brands that supply the data or that make it intelligible [9], being it a government, an international corporation, a funding body, a local store or an individual researcher:

> *Effectively, the promise of "smart" systems is not without bias, since these do not exist in isolation from the conscious and unconscious ideas, techniques, technical components, people, and contexts that have conceived and produced them. Similarly, data is never "just" data. [6]*

Brands are, ultimately, the systemic contexts in which data is created and in which information is produced and shared. They define the boundaries of operations, inspire behaviours, inform the investments, and they lead the pathways to whatever solutions to whatever problems the entities they represent may encounter. Moreover, brands for the 21st century are expected to rely on a purpose-driven proposition[1], and clearly aligned with the UN Sustainable Development Goals. Consequently, in this work brands are:

---

[1] https://sustainablebrands.com

Powerful and ubiquitous systems of organised complexity,
aimed at representing a naturally complex entity, through
carefully crafted identities whose interactive features are not
mere cosmetic touches, but critical assets in creating relevant,
appealing content, and meaningful, authentic and optimised
experiences that are context-related, and subject to mutations.

Hence, the exercise of discussing and planning the *smartness* of any potentially branded entity – be it a product, a service, a space, a community, a country, a person or even a simple concept – without knowing what sort of innate complexity (i.e., biased identity or brand) the entity has, without having its life documented and its people made visible, is considered futile. And, surely today, life can be analysed at unprecedented degrees of granularity, thanks to the endless stream of digital traces.

In this context, and given the particular focus on smart learning ecosystems, it is important that designers not only take on data to have a positive impact on the way individuals live – ultimately to humanise the environment with adaptive, mutative, smarter solutions – but also to carefully consider the brands and identities of smart learning ecosystems and the promises these make. Therefore, the design thinking informing the way how this kind of brand promise is delivered and the impact it may have in the life of the users of smart learning environments is the foundational question underpinning this research.

1.1 The role of design literacy

In 2015, the United Nations formally adopted the 2030 Agenda for Sustainable Development, a comprehensive and integrated plan of action aiming at an equal, prosper and sustainable world for all humans. Its fourth goal focuses on ensuring "inclusive and equitable quality education" whilst promoting "lifelong learning opportunities for all". Under this remit, by 2030, "the number of youth and adults who have relevant skills, including technical and vocational skills, for employment, decent jobs and entrepreneurship", must increase, and all learners must acquire "the knowledge and skills needed to promote sustainable development" [10].

One year later, a number of international learning-centred associations signed the Timisoara Declaration, with the joint mission of developing smart learning ecosystems by, firstly, promoting a fully interoperable tech-sphere, and "producing technologies that are easy to use, adoptable by all, and capable of promoting cultural changes without affecting our quality of life" and which, expectedly, will foster innovation [11]. The signees add that such ecosystems have the potential to emancipate disparate members of a community in becoming active citizens, defending that design literacy is paramount for individuals to develop the ability to manage and solve complex processes, emerging from creative problem solving and diverse sources of data [11]. Therefore, understanding the worth of Design seems to be of utmost importance.

Design is, in fact, an omnipresent discipline and a default human condition. It is a transformational and inspirational humanist system that constantly shapes the world around us, bridging efficiency, efficacy and experience, balancing technical, institutional and human considerations [12, 13]. In a visually saturated society, coding and decoding information visually is becoming a survival skill, and that alone justifies the need for

developing design literacy in all citizens globally, namely when the contribution of design to the economy is increasingly valued due to the relevance of design skills to the so-called fourth industrial revolution [14]. In a smartness context, a requirement for the contributing audiences would be a minimum sense of design purpose and basic systems of enquiry in the context of design – design is an impactful and societal activity in every way [15] and several authors defend it should be more extensively explored at the level of other basic literacies [16, 17, 18]. Alternatively, design literacy could be contemplated within institutional activities focused on Personal Development Planning (PDP), namely in Higher Education environments.

1.2   Smart brands

Design is, as well, a conscious instrument in the development of a brand and being design literate simplifies and enhances the experience one has with a brand. Being a brand a promise of quality (which can be attached to the most explicit features – such as a product's function – and/or to the most subjective aspects – like feelings and emotions), communication is deemed necessary for the entity behind the brand to gain the desired status in its operating context. Designers have been inspired by the challenge of transforming data into meaningful brand experiences. For example, Uber has been successful in making available their geographical, mapping, routing, and activity data, providing users with a fast and relevant experience. Likewise, Spotify's music recommendations are designed to keep users engaged with the platform and consuming its content; by encouraging users to create their own playlists, essentially building an entire library of music on their account, Spotify is a great example of hyper-personalisation. However, many cases fail in doing so, namely 1) when it comes to giving back to their users a data-informed and data-driven interactive result and 2) whilst guaranteeing their visual identity guides all the possible data visualisation interactions.

As with every other entity, smart ecosystems (cities, schools, university campuses, museums, libraries, science parks, etc.) always have a name, in many cases they invest in a tangible visual mark (like a logo) and, therefore, they will be dealing with some sort of branding exercise.

Interestingly, at the beginning of this decade, the expression *smart brand* rose in a limited circle of brand experts' lexicon, and is now slowly expanding, being used to define all sorts of digital and more or less interactive solutions that can be potentially represented by a) a somehow dynamic brand's visual identity system [19, 20, 21, 22, 23], or b) a very flexible marketing approach [24], without necessarily having any correspondence with citizens' active participation and their meaningful construction of knowledge – which entails a minimum and necessary degree of customisation. Moreover, there is no clear definition of what a smart brand is expected to be. Consequently, it is believed that *smart brands*, as commonly used by some brand and design experts, may not involve the smartness design-oriented construct as defined in Timisoara. Since marketing is a field that, by its nature, has not been very popular in human-centred approaches, a designer would probably argue that a *smart brand*'s origin cannot have any relationship with this much commercial and sales-led field.

Hence, one would anticipate it must be more closely related to the design exercise underpinning the conceptualisation and development of a brand. From this perspective,

dynamic brand identities, a concept that draws not only on democratic and postmodernist approaches but also on evolutionary biology, may help in clarifying the concept of what a smart brand could be. These include visual identity projects characterised by flexibility, variability and multiplicity of forms [19, 20, 21, 22, 23], usually relying on a formal genetic code used as a system of basic rules to manage the forms themselves [25]. Naturally, these visual dynamic features are materialised representations of adaptive, flexible and adjusting identities. And, for the purpose of data visualisation of said identities, brands' visual assets – such as the logo – are great showcase displays.

Therefore, the main objective of this ongoing research is to suggest a definition and classification of smart brands so that these can rightfully represent and deliver the smartness promise of smart ecosystems – those already acknowledged as such, but also the environments with the potential of becoming it.

A few fundamental (and speculative) questions initiated this research: Are smart environments being represented by smart brand identities? Can dynamic brand identities be representations of smartness? Should the entity's brand and identity be one of the essential dimensions of smartness? Ultimately, the research question guiding the research has itself a design thinking nature: "How might we utilise a brand's visual identity to provide users with exceptionally optimised experiences?". The obvious sub-questions were:

1. "What are the essential dimensions of a smart brand identity?" and
2. "What kind of information would a smart campus user want to be made visible?"

2   Methods

The research draws on Hermeneutics, informed by Gadamer's perspective that the individuals can only reach their own truth when they understand or master their own experience [26]. It is rooted in the methodological approach of Grounded Theory. Following the inspirational quote by Glaser that "all is data" [27], the research considers Charmaz's guidelines to ensure the adequacy of data quality [28], hence capturing a range of contexts, perspectives and timeframes. Informed by inductive and abductive reasoning supporting a speculative design exercise, this exploratory research resorts to secondary research (fieldnotes and scholarly literature) and qualitative analysis of content in artefacts that resulted from creative workshops purposely organised for collecting this kind of data. Finally, as a means of confirmation of insights, two expert's informal interviews were conducted.

2.1   The exploratory stage

Last decade, some authors [20, 22, 29] seem to have agreed on the main categories that explain the different kinds of what is widely known as Flexible/Dynamic Identities: visual identities that, unlike conventional ones, allow variations and permutations to their visual identity systems (e.g. by changing colours, patterns, typefaces, backgrounds, and even changes in the morphology of logos and symbols), but still guaranteeing they are fully recognised. In fact, as evidence that brand design has been drawing on evolutionary

biology, Kreutz classifies these brand identities as *Mutant* [19] and divides them into Programmed, when a concrete level of control is predetermined by the brand owner, and Poetic, when external interventions (such as those made by the public) may interfere with a few visual identity elements.

Table 1. Taxonomies of Dynamic Brand Identities.

	Felsing (2010)	Van Nes (2012)	Jochum (2013)
1	**Masks/Grids** The symbol or logo act as a container in which its interior will be filled with elements, be they textures or photos.	**Container** The symbol or logo is used as a box, in which its content can be constantly changed in colour and filling images	**Filling & Container** Shapes, letterings or frames are filled or covered with colours, patterns, images, objects, etc.
2	**Elements & Sequence** Two and three-dimensional elements from the original logo are used in different perspectives to create variations	**Wallpaper** A changing background is included behind the brand's logo or symbol	**Background & Layer** Colours, patterns, images, illustrations and animations are layered behind a fixed element, like the logo or symbol
3	**Theme & Variation** Graphic elements, change in size, shape, colour, maintaining the overall theme	**DNA** Based on construction kits which through a set of elements allow different combinations, thus creating new results	**Combination & Composition** A toolbox or set of graphical elements that when combined generate numerous results
4	**Combinatorics** Repetition of patterns, modular systematisation of graphic elements	**Formula** Consists of building a system, composed of rules and/or grids, that allow the construction of a graphically consistent language	**Transformation & Adaptation** Some logo/symbol elements are adapted or transformed by influence of parameters such as colour, data or the media
5	**Permutation** Combinations such as those described in 4, but achieved via computerised systems	**Customised** The logo/symbol allows the audience to interact with it, in some cases, contributing to its very graphical definition	**Customisation & Collaboration** Customers, consumers and employees are invited to contribute to the design of the visual identity
6	**Interaction** Incorporation of real-time processes or data in a dynamic manner	**Generative** The logo/symbol is influenced by external factors such as weather, news or tweets.	**Automation & Transfer** Predefined elements are combined in automatic processes or are generated with the help of algorithms.

In 2010, Ulrike Felsing puts forward six different categories as a possible taxonomy [20]. In 2012, Irene van Nes proposes another framework of six categories [22] which is, one year later, refined by Emanuel Jochum [29]. Table 1 summarises and defines each category, per respective author and, despite some taxonomies following a similar

sequence, the six categories do not necessarily have correspondence across authors, namely between Felsing and the two other authors.

Nonetheless, there are obvious similarities between the three models and, from their six different classifications, two seem to have an essential role in defining what a brand visual identity of a smart environment should consider:

1. Interaction / Customised / Customisation & Collaboration (light orange highlighted on Table 1) – these are the categories defining brands that are open to personalisation strategies, usually involving their audiences in the creation and representational process, such as the case of the visual identity developed to celebrate the 450th anniversary of Rio de Janeiro's foundation as a city (Fig. 1).
2. Permutation / Generative / Automation & Transfer – light blue shaded on Table 1, these are the categories that prescribe a brand's visual identity system as fully data-informed, allowing brand identities to be dynamically represented by live data, fed into and interpreted by special software. Some cases falling under this category are the new visual identity of Dataveyes[2], which originates from the live relations between its staff members and is set in motion by their activity data, or the Italian city of Bologna's new logo[3] which involves a graphics' system that gives stakeholders the possibility to contribute to its visual identity without specific expertise, by resorting to a generative writing system that replaces the Latin alphabet with an alphabet of geometric signs that resemble figurative cultural archetypes of Bologna.
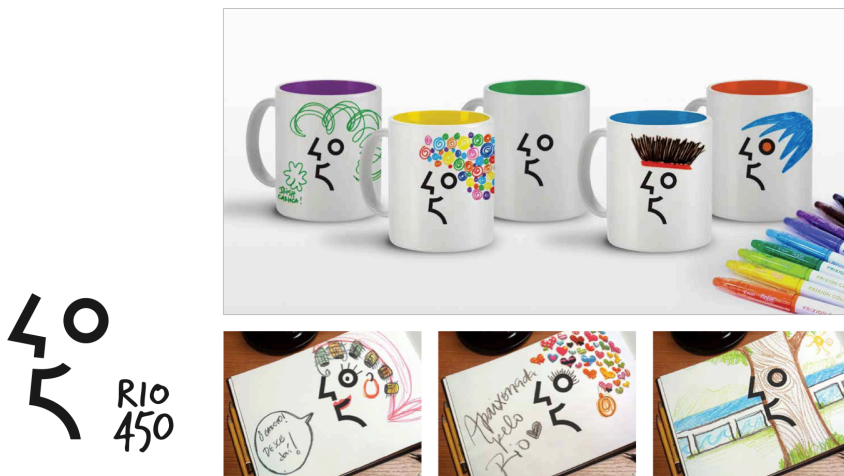

Fig. 1. Customisable brand identity of Rio450[4].

However, none of these brings any practical/helpful advantages to the audiences, beyond the mere entertaining and experiential ones. These cases are often inspired by Generative Design principles, relying on morphogenetic processes that use algorithms for possibly infinite unique and unrepeatable results, as in biological evolution [30].

---

[2] https://bit.ly/2NI2LZL

[3] http://ebologna.it

[4] http://www.crama.com.br/projetos/rio-450/

Nordkyn[5] is likely the best example of a brand visual identity that was designed to be dynamically represented by live data and that provides the audience with meaningful information: its logo reflects the data received by a feed of weather statistics, real-time changing when the direction of the wind or the temperature changes (Fig. 2).
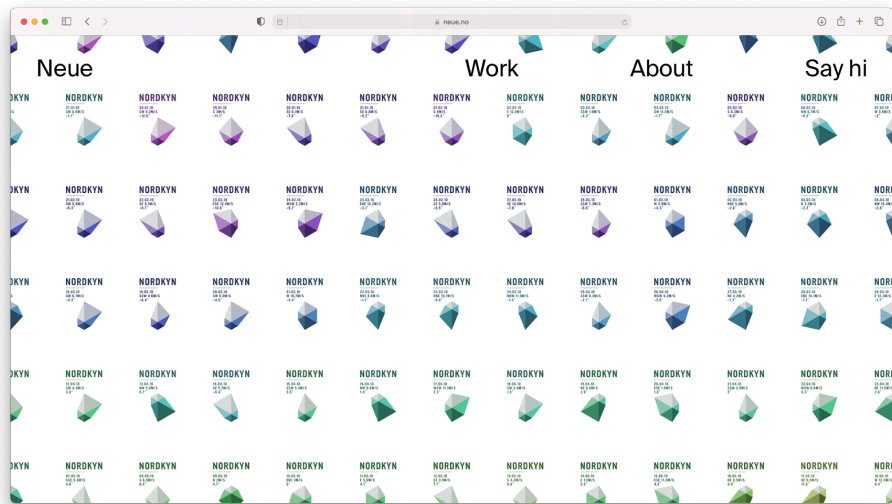

Fig. 2. Computerised brand identity of Nordkyn, screen capture of Neue Studio's website.

In this research, said categories will be labelled, respectively, as *Customisable* and *Computerised*, and will be used as the two main dimensions defining Smart Brand Identities. Hence, this constitutes a possible answer to this research's first sub-question.

2.2 Analysis of eleven campuses' visual identities

Higher Education Institutions' (HEI) campuses are, among cities, museums and schools, one of the most researched kinds of a context where a smart learning environment would have, expectedly, conditions to strive. In a study performed by Accenture [31], 76% of the students involved agreed that one of the main indicators deciding what university to attend was the level of innovation and technological development the university offers. A smart learning ecosystem should not be limited to classroom learning; rather, it should expand its experience outside the lectures, creating a constant development process. Moreover, the generation of children who were born into a life where smartphones are as constant throughout their development as is a spoon has just started making their way into the educational system, and this brings the needs of keeping up with the expectations. The smart campuses area has plenty of opportunities to be explored and universities should start to consider smartness not as a bonus, but as a need.

---

[5] https://neue.no/work/visit-nordkyn/

In 2015, Giovannella *et al.* [32] highlight that the involvement of the end-users – the ones that should benefit from these modifications – has been forgotten in the context of a smart campus. Also, it is this research supposition that the three dimensions proposed by Nam & Pardo [33] to measure smart cities, and that, subsequently, have been adapted and adopted to assess smart campuses [32, 34] – Human, Institutional and Technological – miss the element that establishes the so needed bridge between all of them, which is the Brand and the way the brand (and all data within it) is visually represented.

Hence, this research initiated with an appreciation of the visual identity systems of some of the HEI whose campuses could fall within the smart learning ecosystems' label and that have been used in previously published research, from 2015 to 2020. These were identified via SCOPUS, using the search strings "smart campus", "smart university", "smart learning ecosystem" and "case study", considering contexts falling under the Smart Campus Framework proposed by Pagliaro *et al.* [35] and excluding those that would only cover specific smartness features or indicators (e.g. air quality, electric grid, etc.). The following cases were retrieved:

- American University of Sharjan,
- Aalborg University,
- Imam Abdulrahman Bin Faisal University,
- Polytechnic of Turin,
- Politehnica University of Timișoara,
- University of Aveiro,
- University of Craiova,
- University of Facens,
- University of Málaga,
- University of Rome Tor Vergata,
- University Politehnica of Bucharest.

The main objective was to assess each visual identity case against the two dimensions that have been identified to define Smart Brand Identities. Hence, the aforementioned cases would be considered for the purpose of understanding smart visual identities of brands, if both categories *Customisable* and *Computerised* were to be recognised.

2.3   The field studies

A group of four workshops was organised to capture the possible avenues for Universities' visual identities to be used as smart devices, embedding the smartness ideals defined in the Timisoara Declaration. Three workshops were delivered at the University of West London (UWL) in London, with students enrolled in creative-based courses – BA Advertising and Public Relations, BA Graphic Design and MA Advertising, Branding and Communication – and a fourth one that took place at the Manchester Metropolitan University (MMU) in Manchester, with MPhil/PhD Design students, all of them teaching academics. In total, 57 individuals participated in these workshops, in which, after 1) collaboratively creating mind-maps on what a *smart campus* should be from the participants' perspective (Fig. 3), and 2) following Giovannella *et al.*'s (2015) framework of breaking down Maslow's pyramid [36] to detect their own needs as campus

users, a speculative design exercise allowed them to, individually, anticipate scenarios of meaningful campus-related data visualisation through the HEI's logos (Fig. 4). It should be noted that neither UWL nor MMU's promises include a learning experience on a smart campus.
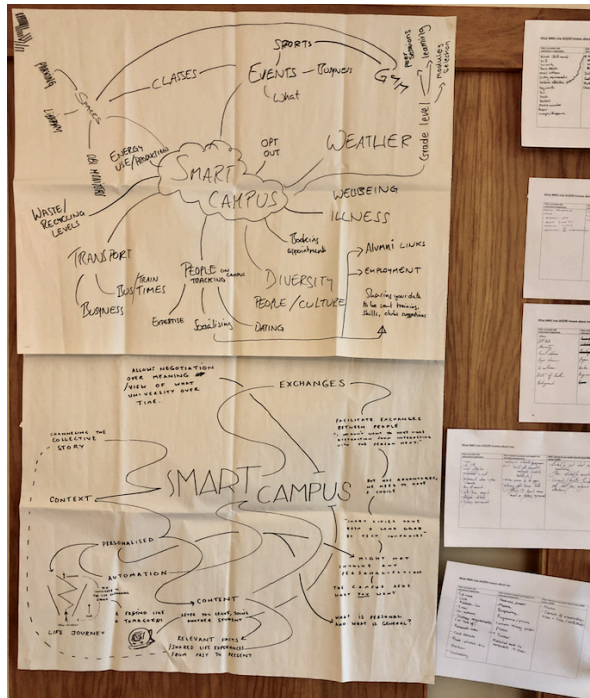

Fig. 3. A sample of the collaboratively produced Smart Campus mind-maps.

Fig. 4. The creative stage at the MMU workshop.

2.4   Consolidating interviews

Two semi-structured (albeit very informal) interviews were arranged with representatives of the Data Department and Communication Office of one UK-based HEI. The questions focused on the current (and possible) interactions between these two departments, with a clear focus on the main messages and media used to communicate with the community and on the streams of internal data circulating and being made visible. The concept of a smart visual identity was also shared with both experts for their opinions to be retrieved. Both conversations took place in an on-campus open space cafeteria and took about 30 minutes each.

3   Findings

3.1   Analysis of the selected HEI's logos

None of the analysed HEIs has anything to do with the suggested conceptualisation of a smart visual identity. In none were found any elements that could indicate a design approach based on the graphical and informational premises of categories *Customised* and *Computerised* (Table 2).

Table 2. Analysis of the logos of selected universities.

HEI	Brand logo	Customisable	Computerised
Aalborg University [Denmark]		N/A	N/A
American University of Sharjan [United Arab Emirates]		N/A	N/A
Imam Abdulrahman Bin Faisal University [Saudi Arabia]		N/A	N/A
Politehnica University of Timișoara [Romania]		N/A	N/A
Polytechnic of Turin [Italy]		N/A	N/A
University of Aveiro [Portugal]		N/A	N/A

University of Craiova [Romania]		N/A	N/A
University of Facens [Brazil]		N/A	N/A
University of Málaga [Spain]		N/A	N/A
University of Rome Tor Vergata [Italy]		N/A	N/A
University Politehnica of Bucharest [Romania]		N/A	N/A

Therefore, if smartness is meant to be informed by design practices and a promise that is expected to be delivered by specific (smart) learning environments, the way it is represented and branded should consistently and coherently crystallise the inherent desire/need of promoting design as a pivotal condition for humans to develop and innovate – and that seems to not be the case in any of the selected HEIs. However, it should be noted that some of the analysed logos have had some visually dynamic incursions, as is the case of University Politehnica of Bucharest when it celebrated its 200th anniversary in 2018 via its logo, and the University of Aveiro, which since its 40th anniversary has been adding to the logo visual clues to its commemorative dates (Fig. 5). This anticipates an openness to a visual dynamism that can be taken over to consider more flexible and interactive brand visual identities if smartness is to be represented, or even better, branded.

Fig. 5. The commemorative and dynamic approach of the University of Aveiro's visual identity.

3.2 Analysis of creative artefacts

The creative workshops supplied an incredibly rich body of data and the analysis was made by participants' profile: in UWL participants were BA (level 6 only) students and

MA (level 7) students (hereafter referred to as *BA+MAs*), and in MMU all participants were PhD students (henceforth *PhDs*). Each workshop included three different activities:

1. Large group activity – smart campus mind-map, grounded on a preliminary understanding of what a smart campus should entail.
2. Small group activity – the perception of personal-related data generated at the HEI and of its usage for the optimisation of life on campus.
3. Individual design exercise – meaningful data visualisation within the institution's logo: the outcome of this activity is the recognition that a smart brand identity can enhance the role of people in leveraging technology, by using data and integrated technologies to optimise services/operations and improve the quality of life with and for all the brand's users/customers.

Activity 1: Smart campus mind-map. Participants were first asked to, collaboratively, create a mind-map of what they would like a smart campus to be and to include. Although this was a task whose purpose was to set the ground for the subsequent activities, it evidenced many differences between BA+MAs and PhDs in how they see a smart campus; for that reason, the mind-maps have been subject to analysis as well.

The data collected from this exercise has been split into two main categories: Customisation (with an obvious link to smart brand's visual identity dimension *Customisable*) and Digitalisation (which links to the *Computerised* aspect of smart brand's visual identities).

In Customisation, both profiles listed a vast group of elements they would like to see "personalisable" and that fall under the theme "Info based on own preferences". They differ in the fact that PhDs also generated references that fall under a theme titled "Info based on peers' preferences" and, most importantly, they drew the "Opt-out" as the first and foremost aspect of customisation they would expect a smart campus to offer.

On the Digitalisation category, the most common references were grouped into four themes, common to both profiles: Space, Time, Learning and Wellbeing. BA+MAs generated a substantial number of ideas under (smart) Space, which could be said is the most popular area for smart interventions between the two profiles. In fact, both listed the relevance of "decibel monitoring", "noise reduction", "library occupancy" and "digital pathways". Interestingly, under Wellbeing the two profiles have quite different preoccupations: whereas BA+MAs mentioned exclusively nutrition-related elements, PhDs are concerned with receiving information on the weather, illnesses and transports. Additionally, the PhDs mind-maps generated two additional themes: Social (with references to "cultural diversity maps" and "expertise tracking") and Sustainability (through mentions to "energy use" and "waste levels"), which are completely absent in BA+MAs' mind-maps.

The results of this first activity seem to evidence that the more mature the campus user is, the more concerned with their social networks and impact on the others/planet they are likely to be. On the other hand, younger users seem to be much more concerned with their individual performance, which is, apparently, dependant on the satisfaction of very basic needs, to some extent corroborating Galego *et al.*'s [37] findings.

Activity 2: Optimisation of life on campus. On this second task participants have been asked to, in groups of two, list all the data that 1) they have provided upon

registration/enrolment, 2) has been created/produced since they use the campus, and 3) they have shared on social media whenever they mentioned or tagged the HEI. Together with the mind-maps, these lists were meant to provide participants with the corpus of information they would need to complete a Maslow Pyramid of Needs in the context of a smart campus, whereby they were asked to include, per level of need, the available relevant data (or that they would not mind making available), to help fulfil their needs as campus users:

Data relevant for satisfying physiological needs. Although in Activity 1 PhDs did not show great concerns with their eating habits or needs, the access to the canteens or restaurants' menus was, in both profiles, the most common reference. This is followed by information on room temperature, the only other coincident topic between the two profiles. However, whereas with the former reference one can anticipate a decision-making process associated with knowing the food options for the day, it is not clear to what extent knowing the environment temperature may lead to any sort of individual action since temperatures on most campuses are centrally managed. This led to some expectation of how this kind of data would be made meaningful and visible on Activity 3. Moreover, some PhDs manifested interest in receiving updates on nearby accommodation (accessibility, availability, tenancy length, monthly costs, neighbours' profiles, etc.).

Data relevant for satisfying safety needs. This was the most popular category, in which both profiles were able to provide more than the double ideas registered in all other categories/needs. Nonetheless, only three themes are common: campus busyness, on-campus health incidents, and location of relaxing spaces. Between PhDs, the most frequent reference is to the location of cloakrooms, as they were all long-distance commuters; BA+MAs' most frequent themes are on the location and occupancy of the counselling room, location of first aid or nearby doctor and on-campus parking availability. Overall, the pattern of safety needs is the term "location". Users want to safely be taken to where they need to go and want to feel safe in such a space.

Data relevant for satisfying belonging needs. Accessing information on the existing different nationalities on campus is the only common topic to both profiles under this category. Country fellowship and shared mother tongue seem to play a big role in the sense of belonging on campuses where the majority of users is neither local nor national. However, this was not, in both profiles, the most mentioned reference: for PhDs, access to subject-related knowledge bases and to keywords describing on-campus events/sessions ("as opposed to *advertise-y* lectures' titles that discourage disciplinary cross-overs") are the most important; BA+MAs are considerably more concerned with developing their social life through shared hobbies and activities promoted by the students' union.

Data relevant for satisfying esteem needs. Similarly, in this category, there was only one common reference to both profiles: "Information on performance awards" (e.g. public praise, citations in news). Notwithstanding, PhDs repeatedly manifested interest in ways of confirming findings with peers, and BA+MAs' most frequent references were to their grade sheets and university achievements. In general, the pattern identified in this category is attached to the idea of "visibility of outcomes".

Data relevant for satisfying self-actualisation needs. Once again, only one theme was found in common between the two profiles: continuous learning opportunities.

Interestingly, BA+MAs most frequent reference was to bursary opportunities – something one would expect to be listed under safety needs, due to its financial rationale. This may have to do with the fact that access to bursaries has increasingly become associated with exceptional previous achievements, hence something that undergraduate students and postgraduate starters, still without enough track record on their accomplishments, do not consider at the most basic levels of their needs. It should be noted that many participants (about half of them) left this category of needs empty.

Activity 3: Smart brand identity design. On this final exercise, participants were asked to, individually, use the HEI's logo to create their own information visualisation based on what they consider relevant and smart campus related. For that, all participants were briefed on the context of dynamic/mutant brands, on the essential dimensions of a Smart Brand Identity (*Customisable* and *Computerised*), and they were reminded that they should 1) consider their needs as a campus user, and 2) that data visualisation has both usefulness and aesthetic at its core. To support the exercise, examples of the types of information visualisation, that had been extracted from McCandless [38], were presented, drawing the participants' attention to the need of focusing on the relationship between objective facts, contextual conditions and human subjectivity.

Each participant was provided with two printed outlines of their HEI's logo, and a full spectrum of coloured markers was made available. For about 30 minutes, participants could use the logos to draft visualisations of data that would be meaningful to them and/or to the entire community of campus users. They were told that should the HEI develop a smart campus app, their designs could become their own personalised app's dashboard (Fig. 6).

Fig. 6. A sample of the outputs created at the workshops

In total, out of the 72 logos in which participants had some sort of intervention, 50 were considered valid prototypes; the remaining included no data at all or data that was not applicable. BA+MA's produced 37 and PhDs generated 13 visualisations of relevant campus-related data. The analysis of these artefacts resorted to a codebook (Fig. 7) that was split into three main anchor codes: *Headlines*, since participants were asked to caption/label all their visual ideas, *Databases*, given the importance of knowing where

the data feeding the logo is expected to come from – whether the user's personal data, such as diary events, the institution's databases or external ones – and *Content*, which would be the actual information to be made visible and that was expected to be inspired by the five categories of needs, as identified in the Maslow's Pyramid breakdown, completed on Activity 2.

Headlines	0	no data/ not applicable
	1	caption explains depicted contents
	2	both caption and visuals allow interpreting depicted contents
Databases	0	no data/ not applicable
	1	own/personal
	2	institutional
	3	external
Content	0	no data/ not applicable
	1	relates to physiological needs
	2	relates to safety needs
	3	relates to belonging needs
	4	relates to esteem needs
	5	relates to self-actualisation needs

Fig. 7. Codebook created to analyse the smart brand identity designs.

Headlines. The majority of BA+MAs' creations (62%) included captions that explained the depicted contents. Only 38% of the designs were carefully explained in what their contents entailed, with both caption and visuals allowing the interpretation of depicted contents. Coincidently, the figures are inverted for PhDs, since 62% of the valid brand identities included both detailed labels and visual hints or even additional written notes explaining the data flow and detailing some possible interaction paradigms. This may be due to these participants' sensitivity toward making information intelligible and accessible, a condition most likely nurtured by both their PhD candidacy and experience as HE academics.

Databases. As expected, in both profiles, the institutional repositories of data were the ones where most of the information would be retrieved, with about 66% of the represented content depending on such databases. Both BA+MAs and PhDs would resort to external and public databases – such as Eventbrite™ or LinkedIn™ as noted by some of the participants – to represent 23% of the information they consider meaningful in a smart campus. A small minority of data would be collected from local resources, such as diaries and other apps with personal relevant data (e.g. health-related information, flight tickets, accommodation bookings).

Content. Given the results obtained in the previous activities, it had been predicted that the two profiles would generate quite different visualisations regarding the five categories of needs: BA+MAs' representations lean toward receiving information that relates to both physiological and safety needs (21% and 35% of all the depicted ideas on this profile, respectively), whereas PhDs are considerably more interested in, simultaneously and in fairly equal proportions, retrieving meaningful data related to safety needs (23%),

belonging needs (29%) and esteem needs (26%). As in Activity 2, self-actualisation needs were not very popular in this exercise.
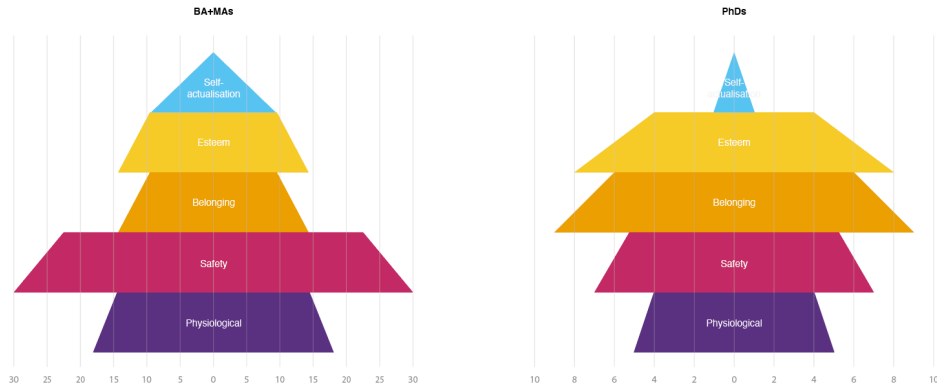

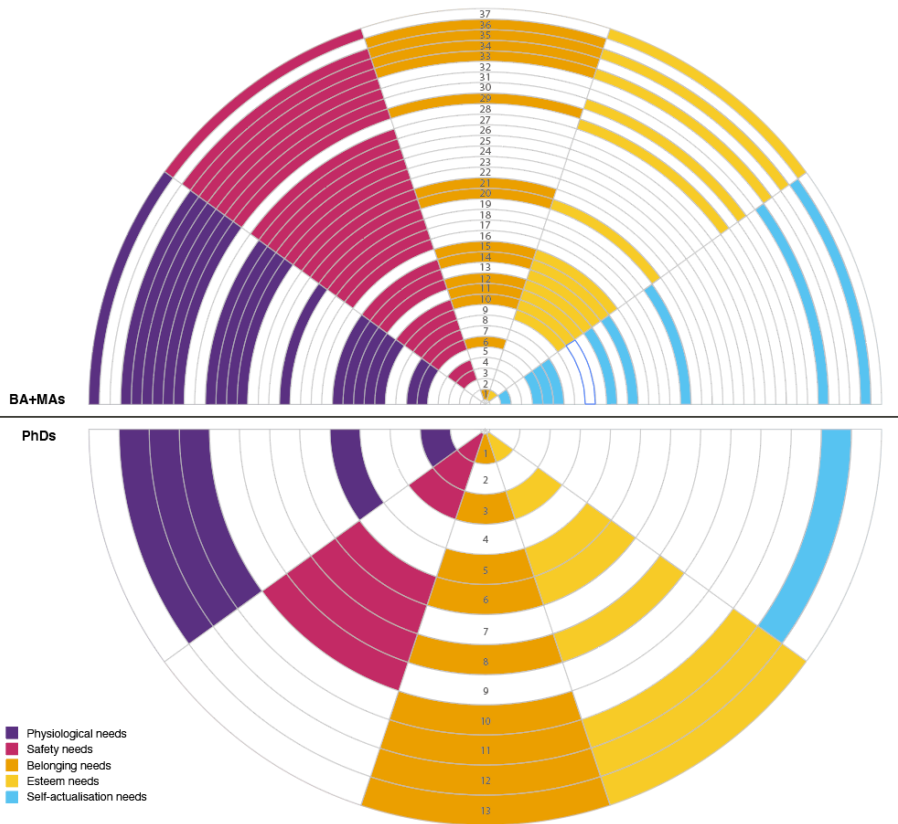**Fig. 8.** The pyramid of needs of smart campus users, according to both profiles.

Fig. 9. Representation of needs per design, in both profiles.

Figure 8 presents the pyramids of both profiles, with the needs that would be, preferably, satisfied by making data visible through a smart brand identity approach, as per the ideas both profiles crafted on their customised HEI's logos. These notorious differences confirm that the Customisation dimension is vital since a one-fits-all version of any kind of resource – to access to and contribute with meaningful information for smart campus users – would be utterly unsatisfactory.

The anchor-code Content allowed the extraction of another kind of information: the number of needs depicted per artefact or design. BA+MAs opted for concentrating their relevant smart campus information on fewer needs, with 30% of their creations presenting information related to one single need and 30% displaying two kinds of needs. On the other hand, about half of the PhDs' creations (46%) cover three different needs on the same logo design, clearly stretching the possibilities of information visualisation within the same visual asset, i.e. the HEI's logo. In Figure 9 each ring represents one valid artefact created by the participants during Activity 3. The top half of the figure presents the needs depicted on each design by the BA+MAs, whilst the bottom half of the graph displays the needs illustrated on each creation made by PhDs.

The most obvious insight from the prototypes created in these workshops is that the information a smart visual identity could give back to its users is, in most cases, geolocation-related, working almost like a "within the campus compass", entailing such a level of complexity that would not just provide users with GPS-like directions for their next meeting/class, avoiding busy corridors or highlighting lifts out of order, but also taking them through a route that would include a hint towards, for example, the nearest toilet/cafe in case the user had not been there for more than a definable number of hours, or if a food/drink order has been made and the item can be collected from any of the campus cafeterias, being the nearest the preferable. In these cases, the visual identity would adopt a flexible and movable graphical approach (likely shape-based), such as the one implemented by Nordkyn.

Other relevant data visualisations for an optimised campus experience had clearly to do with 1) achievement and success, since several instances were studies' progression related (e.g. marks and deadlines, made explicit within the brand logo by colour coding), and 2) sense of belonging and socialisation, as several participants created a visual identity version that would give them a clear sense of, for example, how many country fellows are on campus, or even an expertise map, that could depict the analytics and intensity of experts in a certain subject on campus, at different times and days. It was also mentioned by participants that, by having to customise a highly relatable brand identity, they would develop their sense of belonging toward the HEI which, in brand equity terms, would be seen as increased brand loyalty.

3.3   Confirming insights via experts' interviews

The communication officer stated that one of the most important things of an HEI's brand proposition is that its message has to resonate with the students (and prospective ones), with their values and their beliefs. On the other hand, "If they believe they're coming to a Smart Uni, the institution's brand must deliver that message in every one of its touchpoints". This participant adds that knowing that HEIs may need to develop smart

campuses approaches in the short term, their brands should, immediately, start working in processes and methods to effectively communicate with all the stakeholders, to know the students of all levels better, and, simultaneously, creating opportunities for people to interact with the brand whilst offering a sustainable and responsible environment. Currently, she said, communication with students occurs via three main ways: 1) the adopted virtual learning environment (VLE), through announcements posted by the lecturers, mostly for housekeeping purposes, 2) screens throughout the campuses showcasing either short videos or sequential slideshows, to remind students of specific facilities they can use (e.g. the gym, the postgraduate room, the different stories at the Library, etc) and of the University's most recent achievements (e.g. National Student Survey (NSS) results, students' complimentary statements, etc.) and, the social media, where the latter kinds of contents are common, but also those related to events taking place at the university, and other activities involving public-facing and community engagement. This is the only case where communication can be said to be non-exclusively unidirectional.

The chat with the HEI's data department expert revealed that, although a modern and technology prone university, the institution does not have any tracking mechanism that would allow the use of live records of students on-campus (even though every campus user is only granted entrance after swiping in their institutional ID card). Moreover, its different data-related systems, although sufficiently interconnected, still have many procedural issues (e.g. timeframes for certain registry-related information to be shared with specific systems, such as the VLE), namely from the perspective of making data visible and, consequently, usable. The participant agreed it would be useful to have this information displayed: "Using data the way you suggest would be a really good example of a smart campus". She added that one of the most important steps towards a smart campus is having a focus on who the key stakeholder is, as opposed to being institution focused. Her final remarks were that making data available and, most importantly, visible, would bring a plus to the students' experience, allowing them to access lecture-related live information (such as unexpected and sudden room changes), to know what their current library status is and if their attendance needs improvement.

Both participants mentioned that the current implicit priority (both in terms of communication and use of data) lies in guaranteeing the best possible experience for final year undergraduate students, the ones who complete the NSS, an important resource for the UK University Rankings and League Tables. Both also confirmed the two departments work together, mostly the data section supplying the communication office (confirming that data supplied via social media channels is not considered by the data team), both agreeing that there is much more that can be done about communicating meaningful data to the university stakeholders – all of them. Finally, when presented with the idea of a smart visual identity, while the data specialist demonstrated great enthusiasm, the communications officer said that it would work well in their university but many HEI logos would not allow such a design strategy.

4   Discussion and future steps

Nordkyn is one of the best examples in which useful and meaningful information is being visually depicted in a brand's visual identity, but it fails on the customisation level. Rio450, or even OCAD University, Nutella, Capital D, Design Academy Eindhoven, among others, are excellent examples of brand identities that are open to the user/public's intervention on the surface of their logos, with an extraordinary potential of customisation, but none provides the user (or public) with any relevant or up-to-date information that permits any kind of support, optimisation of resources, monitoring of certain parameters or decision making. One would say these two kinds of brands embed friendly identities, but they fail in being a fully reliable friend – because they are not smart.

It is the researcher's understanding that smart brands would fall within a specific type of flexible/dynamic brand that, among other strategic features, is defined by a *Computerised* dimension – making use of real-time data to implement transmogrifying conditions to their visual attributes or elements (colour, type, shape, relation with space, etc.) – while also by a *Customisable* dimension – allowing the user to personalise the information that, within the operating context of the brand, will support and concede the development of knowledge and a meaningful, optimised experience.

If being smart is to become a core identity element, some entities may need to adapt their brands' message accordingly or, alternatively, create an endorsed regime whereby the idea of smartness can be crystallised and made visible, without the need to change their logos.

However, the conducted exploratory analysis and the interviews held with experts suggest that data visualisation-wise, and in the context of campuses with the potential of becoming smart, brand identities do not include citizens as active participants, do not take any advantage of smart/big data to promote personalised experiences in the context of learning and continuous knowledge creation, and only a few could potentially promote design literacy and creativity, not just by telling, but by doing and leading by example – by looking after the user's best interests, by being helpful, by being a friend.

In fact, empirically, and without the need of much scientific validation, a friend is widely accepted as someone who looks after the other, who contributes with relevant information, who entertains and includes, who wants the other to be knowledgeable, who organises and provides meaningful experiences, who is a strong tie when it comes to networks, who is flexible and adapts to circumstances, who is authentic and true to his/her own identity, and who makes someone else's life easier by optimising it (Fig. 10).

Hence, a smart brand's philosophy should depart from the very idea of "being a friend" and, with this in mind, a definition of "smart brand" is proposed:

> *Smart brands are those that, informed by their own identity and design thinking processes, customise wishes, interests and needs while using contextualised data to nurture learning and creative intelligence, to produce a positive, practical and sustainable impact on citizens' lives. They operate at the same level as friends.*
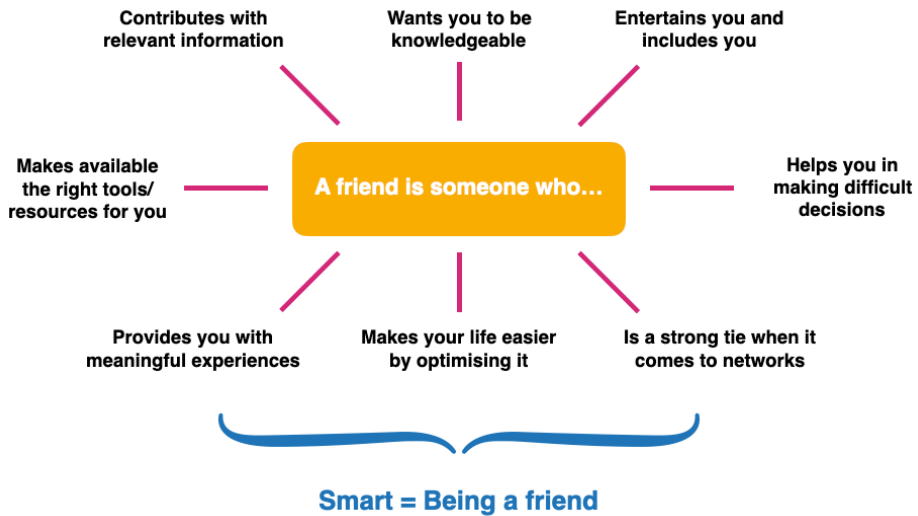
Fig. 10. The conceptual similarity between Being Smart and Being a Friend.

So far, this research allowed the visual analysis of some of the brands of potential smart learning environments, via their logos; with the achieved results, it is expected to demonstrate that one of the defining attributes of smart brands is to include a discourse based on broader dimensions of design. On the other hand, it is being presupposed, with this research, that smart learning environments may not be fully prepared to communicate through a smart brand (identity) approach, and that their promotion of design literacy is not grounded on a systematised or holistic design-based exercise.

In fact, this research shows that, as mentioned before, the three dimensions proposed by Nam & Pardo [33] that have been used to assess the condition of smartness in different contexts, do need the brand to operate as the very necessary and adaptive 21st Century kind of bridge: the Human dimension relies in identification with and belonging to the institution, leading to the development of brand citizenship which means a higher propensity to actively participate and take ownership of actions; the Institutional dimension must be grounded on a unique value proposition (UVP) and equally unique brand identity; and finally, the Technological dimension, concerned with the adequate delivery of information and development of knowledge, is necessarily linked to the design and to the brand ecosystem's infrastructure, if not for other reasons, because every human touchpoint within the entity (and beyond, which may signify the need to consider other brands and identities) creates data opportunities. This means there is a vast plenitude of possible new and further research avenues to be explored.

5   Contribution

According to Interbrand's report on technology Best Global Brands 2020, "brands who own the major platforms, channels and devices have soared in value in 2020" [39]

– which is not surprising, since 2020 was the year in which connectivity assumed incontestable relevance. Education was, along with healthcare and financial services, one of the sectors that most experienced the transformation, in order to provide personalised and efficient engagement, via remote collaboration and data-aggregation. Demand is now data-driven, however, "as consumers place more trust and faith in technology to help them navigate choices and fulfil demand, brands must equally now step up their investment in greater transparency, flexibility and accountability" [39]. Consumers and users increasingly demand integrated ecosystems where data can be of use, translated into layman-friendly languages and adapted to each individual's needs, wishes and desires. Entertaining profiles, participatory strategies and memorable experiences, enabled and promoted through proper and unique interaction schemes based on meaningful use of data, may be exciting ways to overcome the rigid and numerical nature of smart data in which smart things (products, environments, etc.) heavily rely and which, on the other hand, has been massively underused by the very contributing individuals.

Hypermodern brands, in a way, bring to life McLuhan's idea that it is the medium that defines the message and its contents; the brand is, in that sense, a continuous metaprocess – where its visual identity can serve as both medium and content. This is even more true when these allow on-the-fly processing of (and reaction to) data, but also all the asynchronous interaction possibilities which, together with real ordinary people, provide brands with a highly significant character, and people with meaningful and relevant experiences. Brands that help unify and integrate tools and systems add value to humans' lives – and brands are everywhere: from moral frameworks (such as religion and politics) to the very mundane screws on a bench, in a city park.

In this sense, by conceiving brands as friends (hence, smart) they may well be defined by having the responsibility of bringing data back to people, optimising the underlying conditions for learning and for knowledge to be created, shared and expanded. In the context of a campus, they can be used to dynamically represent the level of smartness of the environment and to help its users to have a smarter experience. They could integrate campus related data with the user's specific needs outside campus – but still, campus-related (e.g. the next and nearest public transport to get them to the campus, or the upcoming events on one's area of interest/specialism, by visually expressing data retrieved from apps such as Citymapper™ or Eventbrite™) – hence possibly optimising the user's ecosystem at a broader scale.

Working together, brands and designers can transform data into beautiful, expressive but also functional experiences, certainly contributing to the development of design (and visual) literacy. Data can truly become visual, physical, experiential interactions but, by nature, it is inherently invisible. Brands and their visual-based language resources can be the leading asset in making the invisible visible, namely with the added-value that the data being used is unique to each brand (and its users/consumers). Also, in order to conceive smart learning environments from an actual sociotechnical imaginary point of view, considering how "imagination, objects, and social norms (…) become fused in practice" [40], we need to bring the imaging and storytelling onto these ecosystems, being their brand the richest asset in providing citizens with narratives and design possibilities. And friends should be great at telling stories while allowing us to be part of their stories too.

This research can, hopefully, help in defining a starting point for smart learning environments to conceptualise their own smart brands, developing creative and design thinking-based learning systems, and authentically become what they promise.

References

1. Halpern, O., Mitchell, R. & Geoghegan, B. D.: The Smartness Mandate: Notes toward a Critique, Grey Room 68(26), pp. 106–129 (2017).
2. Giovannella, C.: Where's the smartness of learning in smart territories? Interaction Design and Architecture(s) Journal, 22, pp. 60–68 (2014).
3. ISO 37100: Sustainable development in communities - Vocabulary, December (2016).
4. Sadowski, J. & Bendor, R.: Selling Smartness: Corporate Narratives and the Smart City as a Sociotechnical Imaginary, Science, Technology, & Human Values, 44(3), pp. 540–563 (2019).
5. Imbar, R. V., Supangkat, S. H. & Langi, A. Z. R.: Smart Campus Model: A Literature Review, 2020 International Conference on ICT for Smart Society (ICISS), Bandung, Indonesia (2020).
6. Figueiredo, S. M., Krishnamurthy, S. & Schroeder, T.: What About Smartness?, Architecture and Culture, 7(3), pp. 335–349 (2019).
7. Ribeiro, M.: Universo Programado - Uma alternativa ao Darwinismo e à Religião, Lisboa: Gradiva (2019).
8. Dubberly, H.: Design in the age of biology. ACM Interactions, 15(5), September + October (2008).
9. Cronin, M. J.: Smart Products, Smarter Services: Strategies for Embedded Control. Cambridge: Cambridge University Press (2010).
10. United Nations: Transforming our World: the 2030 Agenda for Sustainable Development (2015).
11. Timisoara Declaration: Better Learning for a Better World through People Centred Smart Learning Ecosystems. Timisoara: ASLERD (2016).
12. Norman, D.: The Design of Everyday Things. Boston: MIT Press (2013).
13. Dabner, D. & Stewart, S.: Graphic Design School: A Foundation Course for Graphic Designers Working in Print, Moving Image and Digital Media (6th Ed). London: Thames and Hudson (2017).
14. The Design Council: The Design Economy 2018: the state of design in the UK (2018).
15. Brown, T.: Change by Design: How design thinking transforms organizations and inspires innovation. New York: Harper Business (2009).
16. Pacione, C.: Evolution of the Mind: A Case for Design Literacy, Interactions, 17 (2), pp. 6–11 (2010).
17. Nielsen, L. M. & Braenne, K.: Design Literacy for Longer Lasting Products, Studies in Material Thinking, 9(7) (2013).
18. Nielsen, L. M.: Design Literacy in General Education. Design and Technology Education: an International Journal, [S.l.], 22(1) (2017).
19. Kreutz, E. A.: Identidade Visual Mutante: uma prática comunicacional da MTV. PhD Thesis. Pontifícia Universidade Católica do Rio Grande do Sul, Porto Alegre, Brazil (2005).
20. Felsing, U.: Dynamic identities in cultural and public contexts. Zurique: Lars Muller Publishers (2010).
21. Jones, R.: Five ways branding is changing. Journal of Brand Management, 20(2), pp. 77–79 (2012).
22. van Nes, I.: Dynamic Identities: How to create a living brand. Amsterdam: BIS (2012).
23. Leitão, S., Lélis, C. & Mealha, O.: Marcas Dinâmicas: Haverá forma de as orientar?, 1st International Congress on Branding, ESTG, 2-4 October 2014, Leiria, Portugal (2014).

24. Hollis, N.: Brand Premium: How Smart Brands Make More Money. New York: Palgrave McMillan (2013).
25. Guida, F. E.: Generative Visual Identities: New Scenarios in Corporate Identity. XVII Generative Art Conference, GA2014, Rome, Italy, 16-19 December (2014).
26. Gadamer, H-G.: Truth and Method, 2nd Ed, London: Sheed and Ward (1989).
27. Glaser, B. G.: Doing Grounded Theory: Issues and Discussions. Mill Valley, CA: Sociology Press (1998).
28. Charmaz, K.: Constructing Grounded Theory: A Practical Guide Through Qualitative Analysis. London: SAGE (2014).
29. Jochum, E.: Dynamic brands: how flexible design systems turn turn brands into dynamic visual identities (Published Master's Thesis) Zurich University of Arts (2013).
30. Soddu, C.: Argenia, a Natural Generative Design. In: Proceedings of the GA1998 – 1st Generative Art Conference. Politecnico di Milano, Italy (1998).
31. Barea, D. & Vasudeva, P.: Accenture Strategy 2015 UK University Graduate Employment Study. Accenture (2015).
32. Giovannella, C., Andone, D., Dascalu, M., Popescu, E., Rehm, M. & Roccasalva, G.: Smartness of Learning Ecosystems and its Bottom-up Emergence in six European Campuses, Interaction Design and Architecture(s) Journal, 27, pp. 79–92 (2015).
33. Nam, T. & Pardo, T. A.: Conceptualizing Smart City with Dimensions of Technology, People, and Institutions. Proceedings of the 12th Annual International Conference on Digital Government Research, pp. 282–291, College Park, MD, USA, June 12-15 (2011).
34. Giovannella, C., Andone, D., Dascalu, M., Popescu, E., Rehm, M. & Mealha, O.: Evaluating the Resilience of the Bottom-up Method used to Detect and Benchmark the Smartness of University Campuses, IEEE International Smart Cities Conference (ISC2), 12-15 September 2016, Trento, Italy (2016).
35. Pagliaro, F., Mattoni, B., Gugliermenti, F., Bisegna, F., Azzaro, B., Tomei, F. & Catucci, S.: A roadmap toward the development of Sapienza Smart Campus, IEEE 16th International Conference on Environment and Electrical Engineering (EEEIC), Florence, Italy, 2016, pp. 1–6 (2016).
36. Maslow A. H.: A theory of human motivation, Psychological Review, 50(4), pp. 370–396 (1943).
37. Galego. D., Giovannella, C. & Mealha, O.: An investigation of actors' differences in the perception of learning ecosystems' smartness: the case of University of Aveiro, Interaction Design and Architecture(s) Journal - IxD&A, 31(1), pp. 19–31 (2016).
38. Mccandless, D.: Information is Beautiful. London: William Collins (2012).
39. Interbrand: Best Global Brands 2020 (Technology) – Connect in the Decade of Possibility (2020).
40. Jasanoff, S.: Imagined and Invented Worlds. In Dreamscapes of Modernity: Sociotechnical Imaginaries and the Fabrication of Power, S. Jasanoff and S.-H. Kim (Eds), pp. 321–342. Chicago, IL: The University of Chicago Press (2015).