CHILDREN CENTRED HYBRID DESIGN SPACES – NEXT RESILIENT DESIGNING GENERATION /-LAB

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ABSTRACT

The future in industry and academia collaborative models for fostering smart products and living areas will be more and more triggered by the human being, involving the user within digital tools. Integrating children as creator means an advanced step in the nearby future, at the one hand from economical point of view, because of the 'war for fighting for talents around the world'. At the other hand, children centred hybrid design spaces will have to be discussed in relationship of 'AI & ethical correct designing' early on, together in cross generational spaces. This scoping paper focussing on hybrid design education by children centred mixed media design spaces. That will have an impetus on participatory design that means integrative designing in more than one level. At the same time all participants will have an educational benefit by cooperation of human beings with AI design(ed) experiences memory - by discussing and modifying ethical values of culture. The children are part of the future discussion about ethical frames for using AI and learning in collaborative reflections on design /-processes with other generations in creating resilient future living (and working) spaces. (236)

Keywords: Hybrid design education, children centred design, humanities for STEMM, reflection as core design competence, ethics & AI in designing

1 INTRODUCTION – AI WAS MY FIRST LOVE FOR DESIGNING GOOD

Integrating children as creator means an advanced step in the nearby future. It is a part of integrative design in an equilibrium of creating future. Creating parameters to offer the frame for a free creative space, that children could get a feeling for design possibilities at all and with AI in special.

Thanks to the reviews of this study, it gave the chance to reflect on the most essential question, the hyper-thesis of children centred design. Our hyper-thesis is*: To more integrate pupils as responsible citizen for designing as engineers, designing together the next city life, with the help of domes and AR spaces – VR integrated - is influenced by the core question of ethical behaviour in designing with AI, so it is a question of evaluating cultural value.* The hyper-thesis is mostly supported, that pupils will have the experiences early as possible, to get in touch with generating and creating future, and getting a feeling for social responsibility. Point: not more and not less. In our case study: the future city is to be designed, with roads, buildings and environments and climatical responsible concepts.

Designing in a cross generational space, the societies impact could be described in three essential elements – FOR THE MACRO-perspective:

1. getting self-confidence in creating their own sustainable life space.
2. getting an understanding of design engineering skills and possibilities early on – as next responsible designer and "consumer".
3. in reflecting with different stakeholders of different generation and ages, they are discussing ethical questions of using AI.

References to AI for school education and ethical questions at this moment, focus on the didactic support for and by the teacher [1]. Or the perspective is described for the students' level and the questions of ethics and AI in Education [2]. There are less studies about the perspective of the generation pupil about nine (9) or ten (10) years old at primary school, designing in AR scenarios and the questions of ethical behaviour in using AI in creating. Even Steel demanded in 2020 'Within the field of education, more research is needed to determine how VR/AR designers make decisions regarding ethical issues, and particularly when integrating media into learning content '[3]. However, a vision gives Lam for a transferable cultural view in January 2025 by stressing Confucius in a metaphorical way by his study of 'Building ethical virtual classrooms: Confucian perspectives on avatars and VR' [4].

Our scoping paper will underline that the future of children early involved into designing in cross generational spaces, the impact could be seen in three essential elements FOR THE MICRO-perspective:

- To be involved in simulated scenarios of the future.
- Being enabled about the skills of design engineers early on.
- Promoting self confidence in being design engineer in the future.
- Learning by discussing ethical questions of culture in design within AI.

Within the post-digital phase of industry and transformation, during the era of 'wars of sources', it is time, that we are offering our children the capacity, they need to design their *own* society, economy and environment of themself later [5]. This exemplary statement by Jeannette zu Fürstenberg, one of the rare female risk capital investors in Europe, could also be related to the economical trigger point and the loss of experts. It leads to the statement by Olivier Scalabre, director of Boston Consulting Group France in 2024, as 'La guerre des talents est mondiale' [6], as a 'war for fighting for talents around the world'. Industries need to begin earlier in formation of design and engineering graduates by **pre-academic projects**. But more important will be the ability to solve crises with design(ing) skills, getting the competences and the self-confidence, that creates 'good life on earth'. Twenty years ago, Helga Nowotny declared that 'innovation' was the starting point for negotiating (with) the future, but the term of innovation had been changed. The desire and curiosity for discovery has not disappeared, but they have lost some of their former independence and self-image [7]. And let us look about the skills of designing as child without and with the ability of reflecting your design doing; this is a question of age and being confronted with ethical questions of cultural behaviour – human behaviour.

This scoping paper focusses on the potential of playful designing in architecture, by experimenting with AI tools – the potential of immersive creating spaces, just like dome-labs and VR-glasses (VR – Virtual Reality), creating within the MR (Mixed Reality) and AR (Augmented Reality) but learning with real tactile experiences. The discussion of 'interlinked learning landscapes' [8] in cross-medial, non-hierarchical, interdisciplinary workshops since 2019 argue the importance of a re-valuation of human experiences regarding manual designing, in particular that of children, e.g., by drawing in the sand [9]. This time the thesis of this scoping paper of 'children centred design spaces' is dealing with the question whether **mixed reality spaces could be a resilient tool for designing future, for the next generation,** by using AR-instruments and learning about 'ethical behaviour'. The scenario is beneficial by the curiosity of children to act for design scenarios – at the stage of theatres or at the field for city mapping. This research paper focusses on significant didactic approaches to design sustainable concepts of future – with the playing field of living scenarios. Getting in touch with design and nature, with architecture and theatre stages, in special in mapping the city and for theatre illusory images. This gives the playing ground. Let us experience with future in a playing field, with the naïve view like children are playing with at the kindergarten: Copying the adults' places and ideating the new – together!

This scoping paper is an experiment to former declaration of conventional '*collaborative impetus of human embodied experiences WITH the 'AI body' […] for behold on crafts technologies and hands on designing as embodied experiences FIRST – before designing with AI.*' [10]. It means the other way around in seducing children **with** their beloved items, playing with immersive design spaces, with VR and AR instruments *before* creating the 'real world' as tactile experience (textiles and other materials and surfaces), by anticipation and simulation in designing landscapes.

Relevant questions to solve are: What are the relevant designing tools and competences we need in a complex world, in an *ethical correct* **'contextual designing' world? What does 'ethical correct' mean within conventional and unconventional designing scenarios. Because 'unconventional' visionary modelling is the core value of the discipline of design and the trigger for sustainable future scenarios, to be built with the help of AI**. What about 'the impact of man-made rebellions with hands on designing and materiality as trigger points? What about 'a strong believe, that we must shape our (human body triggered) AI tools before AI shape us' [11], and in particular when architects are speaking about a 'digital hand' [12]? What are the precise demands for a children centred hybrid design space, our future designer and architects?

2 PLAYING WITH THE 'DIGITAL HAND' – QUESTION OF INTEGRATIVE & EMPATHY DESIGN? – THE SCOPING PROCESS-SCENARIO

2.1 'Children centred design for complex problem-solving design concepts - creating together (the) ethical framework

Large language models are important in designing future, as important as design languages created by human's ability of designing with different senses. If we are looking at **interdisciplinary designing** workshops with focus on materials, like 'Materialising Immateriality Workshop' practised with student form different countries and COIL-design projects (Collaborative Online International Learning), both educational fields are simulating future by design with cross cultural impetus. Both are giving us the ability to get experiences in integrative design, intercultural design, experimenting design and empathy design. Empathy design is based on the skill of feeling emotions of myself and of other persons. More important is the basis of empathy about self-awareness [13]. You learn to be aware of the feelings and needs of other persons, of other cultures and different problems in unexpected contexts.

'Contextual Design is a structured, well-defined user-centred design process that provides methods to collect data about users in the field, interpret and consolidate that data in a structured way, use the data to create and prototype product and service concepts, and iteratively test and refine those concepts with users. This is the core of the Contextual Design philosophy. '[14], Karen Holzblatt is arguing.

By using participatory design, human centred design by integrative design and experimenting design, all these methods are beneficial to create the human centred multi-sensual knowledge. In this designing space, synaesthetic design comes into play, when the child as user in operating touch points is integrated with tones and tactile trigger elements, within the MR. 'With memorable tactile experiences for the collaborative designer, and the user as a collaborative friend in terms of sustainability' [15], this visionary scoping paper formulates innovative cross generational programs for industries and academics sake: We would like to invite children by the age of younger than nine (9) years old **and** older than ten (10), with the expectation, that perhaps both of the groups will design with different competences. Because teens, as older than nine (9) years are supposed to have the ability of reflecting designed objects, -processes and human behaviour [16]. Reflection is key in creating resilient design and living atmospheres with all senses. Creating in and for resilient places in the city, we should promote peer-learning cross generational and a supportive culture [17], triggered by all senses.

2.2 'Expected findings: How 'to *map* the world' with the following levels: abstraction – simulation – evaluation – reflection – selection – comparing – ideating the New

With experts from MR and VR-Fields in design engineering, from graphical design, textile design engineering, architects and multimedia laboratories and other institutions like theatre, the children are being involved in a space, that could be the multi-sensual basement for the 'house to build'. The holistic educated design engineer of the future would be educated by different senses by using analogue and digital instruments. With different selecting fields, and the ability in de-coding the design language in each sense step by step – the core competence of *reflecting* design will be set as precondition.

The precondition for a complex problem solver of the future, could be described in creating scenarios with narrative and abstract elements for interpretation.

Two examples following for scoping project scenarios: First project is titled 'Music was my first love' to transfer music into a 'experience memory pathway' [18], children are getting in touch with tones of (classical) music to create the next art applied solution with their *own instruments*. Designing the images, buildings, rooms, with pathways for the humans, the protagonists – like they know from stories, reports and sometimes movies. 'Tones & textiles' could be trigger-points with a children's story. The textile, tactile level will come into play, for imagination and imaging the scene, step by step, within hybrid design spaces. The theatre stage design is one example of this, but until now less open for children to design. [19]

Mapping the world, if real or fantasy, has the didactically purpose on different levels, from the pedagogical and design theoretical side. The designing child, student and adult take profit by anticipating the procedure, of participating, reading and interpretating, comparing for decoding references, remembering and classification by associating, selection and scaling. [20]. The possibility of reading abstract phenomena and to transfer it into design / systems, could be trained early on. By the skill ability for a student to be trained, the perspective lays '*In the future, for designer it is important that 3D modelling is perfectly integrated to MR interactive designing tools, that we are able to create directly with VR headsets within the connected design area.*' [21]. At the same time that means software

programs like blender, substance painter and grasshopper for example as rendering level, to simulate materials and textures, are putting together all designing parameters within the virtual room. Tones, music and headsets as new designing tool (see fig. 1) in a playing space. These elements could be used as THE beloved item by children, building calm spaces for the individual and in addition a community-based tool if demanded (fig. 1).

The second project is focussing on the architectural playing field, titled with: 'Digital was my first love'. The dome-design scenario is the trigger point for mapping (designing) the city. By playing in immersive designing landscapes, it shows a different driving element for developing immersive design spaces: that '*focus on technological innovation and new applications. It will scrutinize how these immersive technologies are currently being harnessed to enhance the efficiency, accuracy, and safety of construction projects.*' [22] This statement shows the focus of academic and industrial representatives - adults' perspective. It is a very senseful purpose to more connected application levels of the designer, the producer, the construction builder and data manager (the architect or the programme manager of the theatres laboratories) as complex problem solver of the future: this is the design engineer. Remember the purpose of BIM (Building Information Modelling) by architects in transformation to sustainable design management, a demanded model in 2020: iDIM, a '*new sense of corporate social responsibility to emerge and be enabled by designing together in immersive, integrated AR systems, which are combined with an interlinked Design Information Modelling (see Wachs, M.-E. 2020) system.*' [23]

Figure 1. Sketch of children creating life with 'audible connexion tools', 2025, by the author

3   DISCUSSIONS: NEXT STEPS FOR INTEGRATING CHILDREN CENTRED DESIGN – LIMITATIONS OF ETHICAL *CORRECT* DESIGNING SPACES

3.1 Children centred co-designing labs – and the naïve view in MR – the next level(s)

A naïve, unconventional view by children, playing and designing new living spaces within the immersive possibilities will give real responsibility to the next generation, to build the frame like entrepreneur Fürstenberg demands – see above. We must span on the designing scenario with(in) AI in discussing ethical pathways in collaboration with AI - cross generational.

Both, scenario building by city planning by architects and scenario building at the stage of the theatre - in immersive technology based creating spaces, like the children centred hybrid design spaces having in mind - focussing at the following aims: First of all, to simulate and to enable '*designers to work together with citizens to create a laboratory of solutions for everyday life, improving existing services and designing new ones.*'[24] Integrating children into the circle of citizens is obvious and beneficial in two dimensions:

The impact of music in relation to the neuro-scientific knowledge, and that children are getting a new ability of reflection by the age of nine (9) years, is part of this project. To involve pupils by their beloved tools, this is the 'motivation to act' (Corine Pelluchon) to come into designing playing fields, for designing the experiences by themselves. It is at the same time, creating the *architecture of your interactive design behaviour* you need later on, what can be estimated as 'tacit dimension', that is defined by Polanyi [25] and that is valuable to consider within the relation for 'humanities & STEMM'. In supporting human centred hybrid design landscapes and immersive rooms, a system of 'synaesthesia reloaded', a re-valuing multi sensual analogue and digital, tactile trained empathy could be beneficial for the next design(er) generation. The next steps will be to organise the integrative design process with different stakeholders: at the one hand with e.g. Ligeti Centre Hamburg and XR Lab by University HAW

Hamburg' [26] and studios of architecture with dome labs – like Studio Schwitalla Berlin is offering. At the other hand open minded trainer from schools, kindergarten and represents from industries come together to build the community of human cross generational centred design collaboration by 'mapping', creating (the) world. (At this moment the decision about financial support is in the final loop.)

3.2 The potential of immersive spaces by designing cross generational resilient – reflection as core competence for future co-creating, ethical design/-learning spaces & limitations

The scoped mixed media designing spaces within the 'second machine age of the AI', a term used by the philosopher Precht [27] – must be defined for mixed groups of stakeholders, by design engineers, architects, industrial partners, school representatives AND children *together*. It offers AI based experiences and a beloved positive memory carta for the next generation to come: the next generation of creators, human beings with the idea for sustainable life on earth – and self-confidence in that. In this frame our project stands in reference to sketched micro- and macro-perspective of futures design competences (see chapter 1) of the 'next resilient designing generation'. In addition, this project will focus the next generation of AI-tools, computing methods, that should be set up early on by integrative design and integrative learning lessons of humanities interconnected with STEMM courses and the next design engineer talent at the same time. The AI-tools and the human being has limited action possibilities, but cross generational perspective could take it to an ethical high level in open discussions. With the experience in that as educational frame, human centred design creates no space for senseless design, this is resilient. It discusses the ethical frame what should be done by AI for the human life circle by integrating the specific values of humans – in ethical correct conditions. But what means 'ethical correct' from different cultural and -ages point of view. This is a limitation about the project and more projects in the future should serve to this important element: to precise - and modify in each timeframe - this sociological, philosophical and anthropological point of view in the future. But all projects will serve to the strength of co-creation, in special the benefits from the side of the human values: Emotions, fantasy, unconventional designing processes, having the holistic view in mind.

In the year 2019, Sandra Groll mentioned: '*artefacts cannot shape themselves. However, they must be designed in a specific way to play a meaningful role in action contexts and social interaction in order to positively influence these interactions. The contingency problem of the appearance of the artificial co-societal society can only be solved by design.*' [28] Why not to co-create with emotional intelligence in interaction designing with joy and curiosity of children, to create together in immersive hybrid design spaces? The tool of a dome based immersive lab will be more specified for the future by all together – integrating ethical discussions at the same time, immersive learning of cultural values.

'*In particular, the DomeLab provides an interface for designers to work with popular game development technology, such as unity. Without the technologic concerns of developing the domes themselves, research can shift focus towards designing games and novel experiences for them.*' [29] In addition it brings back the preconditions for ideating innovation: curiosity for discovery the New, that was referenced to Helga Nowotny – at the beginning of this scoping paper. This will lead to an evolution of the system in solving complex problems and embracing uncertainty and the unknown by *reflecting* design [30].

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