Effortless Capture of Design Output

A Prerequisite for Building a Design Repository with Quantified Design Output

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Abstract— **In this paper, we argue for building a repository for capturing, tagging and sharing design output (prototype) and activities (process), enabling researchers to better discover and understand causalities in early stage product development (PD). Ultimately, we want to understand how to handle uncertainty, ambiguous information, and vast solution spaces in early-stage PD by studying the designers' ability to learn (i.e. reflect and adapt). This paper presents a theoretical view, and serves as a starting point for researching the output of the early-stage PD as output from the activities done by the participants (i.e. designers), accumulated over time. Further on, such sequential outputs (and activities) may be uploaded into a shared repository that can be used for both research and practice. To show how this theoretical framework translates into actual projects, we describe a use-case of prototyping injection molding tools, followed by showing a tangible example of starting such a repository. As gathering data on activity and output in product development is a cumbersome and time-consuming process, the instrument must be nonintrusive and time-efficient.**

Keywords—design output; capturing output; prototyping; prototypes; design repository;

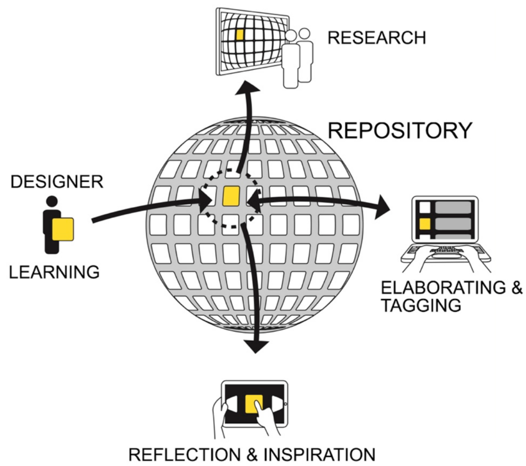

Fig. 1. A repository for capturing, elaborating and sharing the process and artifact output from design activity.

I. INTRODUCTION

In this paper, we describe a theoretical framework for an evolutionary repository for capturing information and knowledge from real industry projects, and sharing this output for both researchers and practitioners in engineering design (Fig. 1). The described approach will be supported by a use-case with the potential to benefit from such a repository and a technical instrument for applying this concept in practice. This paper researches the early stages of Product Development (PD) and engineering design—more precisely the pre-requirement stage of development. In the 'fuzzy front end' [1] of engineering design, practitioners are typically facing ambiguous information, uncertainty (as a result of not having requirements and specifications) and vast solution spaces. Because what is done in these early stages greatly impacts cost, quality and many of the following development activities closer to the launch of the product(s), there is a need to fundamentally understand the causalities of early-stage development. In this context [2, 3], we explore the challenges of dealing with such ambiguity [4] and uncertainty, as well as unknown unknowns [5], when dealing with complex problems and products in a socio-technical system.

This exploration aims to understand people, interactions, decisions and learnings of development projects. According to [6], the output of most design activity is twofold; one part being information (explicit knowledge), and the other being experience (tacit knowledge). The output might be formalized in terms of text, numbers or simulation data, or crude, reflective prototypes used within the team [7, 8], which we summarize as 'artifacts'.

Aiming to understand both design activity and output in product development, we are focusing on projects doing design of physical and mechatronic prototypes, with the research goal of observation and quantification of said design activity. Focus is placed on capturing tangible artifacts created as output from design activity, with the future aim to create a repository (Fig. 1) for storing the design output (artifacts from real industry examples) for future re-use.

There are two main reasons for capturing the output from development projects; the first for researching the output, aiming to quantify prototyping tools and methods. The second is to help the designers during (by supporting documentation) and after (by providing access to previous project output) their projects. In the continuation we will mostly focus on the first of these two motivations, as our main goal is researching prototyping use and impact. However, one of the major practical challenges in researching variety of case examples from real world industry projects is getting access and interest from the industry. We argue that one of the reasons why this is hard is due to the lack of mutual benefit from such collaborations. Hence, this repository would a) help researchers in understanding the correlation between design activity and project output [9] and b) aid designers in reflecting and improving their product development capabilities [10], thus creating value for both researchers and industry collaborators.

It is worth noting that while there has been much work aimed at supporting designers through various digital and physical repositories, typically aimed at later-stage development projects for more formal workflow or documentation routines. Both the design and the engineering design communities have been addressing these challenges for some time [11 – 16]. Hence, the novelty from this project is not addressing the support of designers dealing with physical projects, but rather enabling researchers to study and quantify case examples concerning development of physical products.

The goal of researching the evolving output from development projects is understanding learning in product development, and how PD projects evolve through multiple learning cycles [17]. The practical challenges will be capturing and quantifying the design output, and we claim that a pre-requisite for gathering this data is a hassle-free user experience.

II. Theoretical Framework of the Repository

Using a theoretical analogy, we formulate the total output of the development project as the (value added) activity increments done by the project participants (i.e. designers), accumulated over time. Building on this, we aim to compare the relations between time (both ‘spent’ and ‘not spent’), processes and output.

As measuring the learning in design activity is very difficult, we need proxies for measuring the learnings (output). In our research laboratory setting, most of the tangible output is either written ideas, sketches or low-resolution explorative prototypes (both communicative and functional) that are used within the design-teams for learning and sharing ideas [2]. We state that these tangible artifacts can be used as proxies for explicit design output, knowing that we are not able to fully measure the tacit output, as described in [7]. Therefore, we are aiming to study input/output (and thus cause/effect) relations by capturing artifacts over time-series. Following this theoretical perspective, a repository would then be the collection of all the design outputs created, captured and made reusable.

To research the various activities and people that interact within this context, we are linking quantitative sensory measurements and activity monitoring [18, 19] with qualitative assessment and observations of output to get a holistic overview of early-stage design activities. In this way, we intend linking designers (both teams and individuals), time, performance, tools and activities to see patterns in an as nonintrusive way as possible; i.e., to reduce both threshold of use and time spent for recording data as far as possible. This quantification of output is limited to multiple images with adjacent information and annotations. However, we aim at including other measurements (e.g. 3D-scanning, weight, volumetric information (height, width, length), material properties, etc.) as soon as possible.

From the designer’s perspective, we are aiming to make this process of capturing output as seamless as possible, enabling feedback to the team as a side effect of recording data. With measurement and assessment tools working in tandem, one could imagine to alter the activities, workshop tools, equipment, materials and layout or team composition to compare project outputs in terms of various measurements, such as quantity, resolution, time spent per iteration, complexity, newness, innovativeness, user involvement, etc.

While studying input/output relations in design activity over time, we argue that we need short time increments (high sampling rate) of data, as we prefer to down sample high fidelity data rather than interpolating over low fidelity data. Further, we expect that the usefulness of researching the input/output relations increases with frequency of output. For example, if one record output with a six-month sampling rate, getting a sensible overview over impacting factors will be practically impossible. Conversely, doing weekly (or preferably faster) samplings might provide a more nuanced overview of different activity and output. With a higher sampling rate, we also enable both researchers and designers to ‘zoom out’, getting a wider perspective of the processes, while learning effects that accumulate over time. The notion of having a high sampling rate is arguably a positive feedback loop for the designers, meaning that recording output often will increase the usefulness of the tool, both helping in documenting projects and in remembering past learnings and reflections. The cost of this higher fidelity will be the physical time spent capturing the information, which leads us back to the requirement that the capturing of the design output should be as effortless as possible and seen so beneficial that it is perceived less hassle to do the capturing. It is worth noting that a low sampling rate in this setting could mean one of two things; either low activity levels of development or low interaction with the device(s) that do the sampling, e.g. perceived the capturing less enjoyable.

Fig. 2. Case example prototypes in the same picture.

III. The Need of a Repository: Case Example of Prototyping Injection Molded Components

To show how this theoretical framework translates into real world projects, we will in the following describe one case example in terms of the repository. In an article by Kriesi et al. [9], the authors were challenged to create small series injection molded components rapidly and cost efficiently as a part of a research project investigating the transfer and handover between CAD-models, 3D-printed prototypes and injection molded components. In this design process, 3D-printing was deemed suitable only for investigating visual purpose since it could not offer the mechanical properties and similar final 'feel' as injection molding as the components will be used as user interfaces and functional parts in chairs. However, as the products are intended for injection molding, there is considerable difficulty in assuring that the final injection molding process would provide the capabilities planned, and also that the molded component would have the required structural integrity. The original idea was to make a simulation model that would verify that each tool would create products that had no defects already before moving into production. After the first attempts to simulate the problem, it was evident that the non-linear behavior of the injected materials (in this case Polypropylene) makes the simulation inaccurate and potentially time consuming at this stage of development. Moreover, altering the design of the products requires attention from a design analysis specialist. Based on these considerations, the designers ended up prototyping their way to design a hand operated desktop sized injection molding device that could mold simple test geometries. In this project, the molding device itself was a result of a prototyping journey. However, after the concept was proven, also the ways of using the machine with different materials for the molding tools were prototyped. The goal was to see how far the authors could go with this simple approach of using desktop injection molding and direct rapid tooling. They started with 3D printing by early attempts to print the tools with all the available machines. This inspired the authors to use also a milling machine for materials such as wood and aluminum. The natural continuation for the project was trying out different coatings for the tools. This strategy generated a lot of prototypes, as seen in Fig. 2. Eventually, the insights were fed back into the process and the high potential approaches were chosen to go forward towards the full-scale production. Then, the tools produced with direct rapid tooling were taken to a production level injection molding machines to see how they performed in an actual production settings.

Mold Name	Material	Rapid Prototyping Machine	Coating
HDPU foam	HDPU foam	Roland MDX-540	West systems 105 epoxy. Renlease QV5110 release agent.
Epoxy-Wood	Red Oak	Roland MDX-540	West systems 105 epoxy. Renlease QV5110 release agent.
Aluminum	AA 6082-T6	Roland MDX-540	Renlease QV5110 release agent.
Epoxy Coated Paper	Paper	Mcor IRIS	West systems 105 epoxy.

Fig. 3. Example output from prototyping activity.

In this case example, designers were doing fast in-situ documentation by (mostly) snapping quick photographs of the various output with their smartphones or tablets. This is a quick way of saving a moment or memory—however, it is not a very convenient strategy for other designers who would ultimately need access to the same photographs without the photographer having to actively share the photo with other team members. Also, the project requires these pictures to be stored in an organized way for documentation purposes. Sometimes also just going forward in the project would benefit from the inspiration of the designer's old projects or others' projects. Typical outcome of a prototyping round is illustrated in Fig. 3.

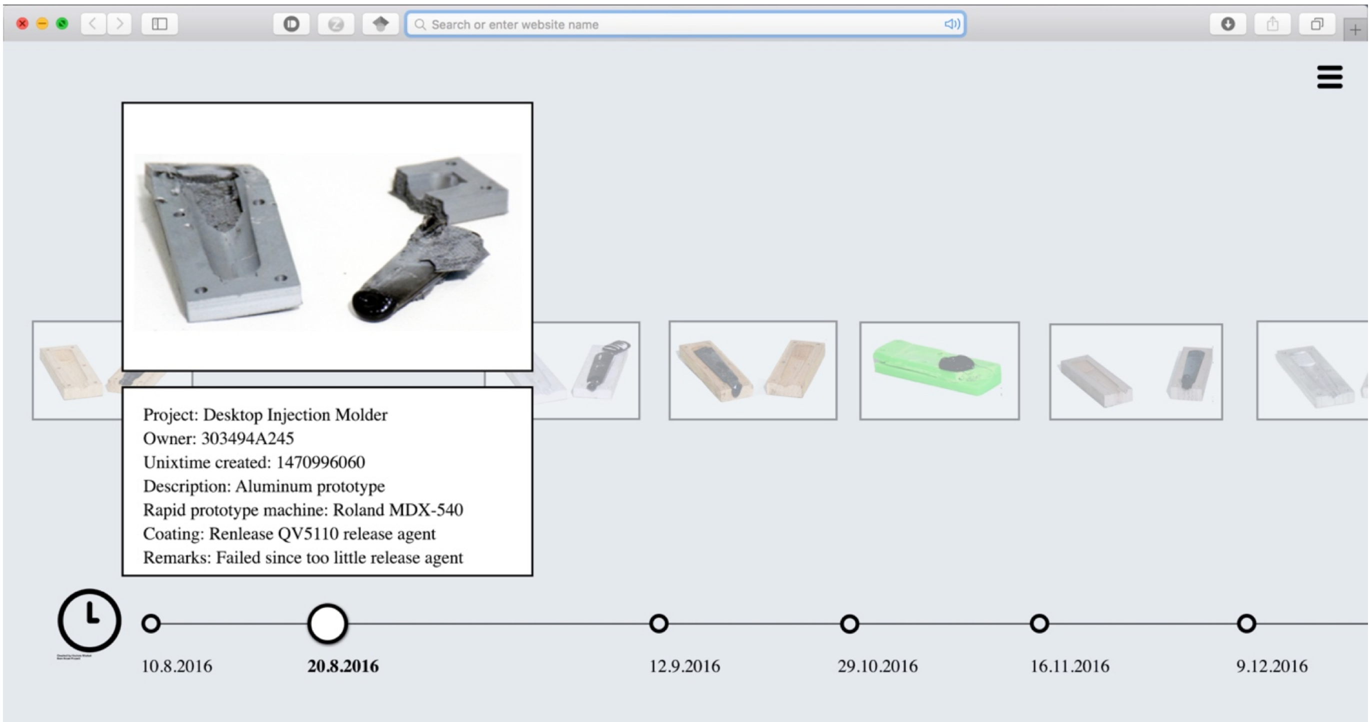

Fig. 4. The User interface of the repository in 'Designers view' showing the example project in pictures.

It is worth noting that these pictures and additional information were created significantly later than the prototypes, based on handmade notes and an additional photographing session. This way of working might also leave out documentation of many of the failed prototypes that could have been interesting to see for other people as well.

Overall, this project lacked an easy process could aid in recording data from process and output, before organizing this data and thus making the knowledge and experience more explicit. In the case example, there was a steady flow of new prototypes and by enabling designers to do continuous documentation this would have made it easier to manage the project. Moreover, third parties cannot access the data and learnings, meaning that the data cannot generate value outside the project environment. This case is an example of a project with a lot of output in the form of prototypes made in a number of iteration cycles.

IV. Conceptual Model of the Repository

As seen from the case example above, both the designers taking part in the project, as well as researchers studying the design activities, would have benefited from having a repository of the design output. In short, the principle of creating the repository should be making the threshold and time needed for interaction as low as possible. Our hypothesis is that by offering quick and easy experience for laboratory users (i.e. designers) to document projects, we (as researchers) would gain better insights of the activities of the research lab in the form of quantified data. We argue that a low threshold of use is of key importance. On the other hand, creating yet another complicated tool for documenting projects generates a risk that quality and consistency of the data could decline to a level that it is unusable for research purposes. By creating incentives for the laboratory users to use a repository—both to add and extract information—we increase the possibility of recording all the outputs of the design activities in the laboratory.

We argue that since the repository should be expandable, as the various input methods evolve as we learn more about both design activity and output. This means that both inputs (sensory and other) and outputs are intentionally left open for modification, with the core idea that we do not want to remove raw data as the repository grows. Therefore, sensory inputs can be added, interfaces can be changed and the repository itself can grow steadily without losing previously gathered information. For example, infrared (depth sensing) cameras and load cells could be added, giving access to volumetric data and wheight for each entry. Note that this would only add the new sensor inputs to new entries, as old entries in the repository would lack this information.

The repository will need to fulfill several functions, as detailed in Fig. 1. Firstly, the repository needs user (designer) input. Here we limit ourselves to describing capturing artifacts as this input, but this could also easily include sensory measurements and other interactions [19]. Secondly, there must be an interface that can be used for a) visualizing content (extracting information) and b) adding information or elaborating on existing inputs. Lastly, the repository itself will need to provide the capability to store all the inputs, preferably in a safe and accessible location, either physical or network-based. Below we detail out how to start exploring these core functions of such a repository.

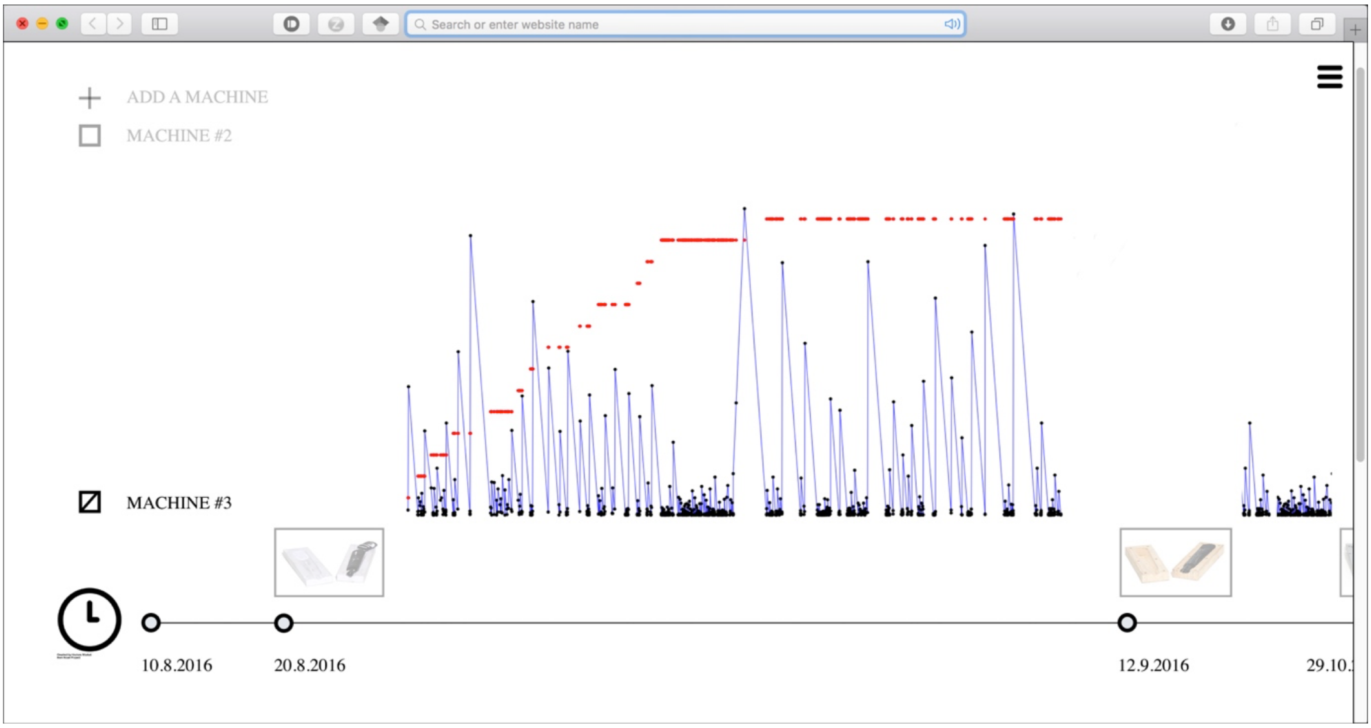

Fig. 5. The imagined user interface of the repository in 'Researcher's view' with visualized project inputs and outputs.

V. VISUALIZING THE REPOSITORY

The repository does not create any value before the user or the researcher can have a look at the recorded data in a meaningful way. The user interface to the repository offers a view to the history of the laboratory. Ideally, the laboratory itself records everything that happens inside it as an input (usage of tools, interactions, etc.) and the user interface of the repository shows a representation of the prototypes as an output (in this case pictures). The repository can be visualized in many ways, and we have decided to use the timeline of the activities as a default view since it offers a quick overview of the data. Also, the input dimensions can be visualized in the same interface that will be called the "researcher's view". Here it is possible to zoom in to a certain period or zoom out and look at the activities from a more distant perspective. Time was picked as the most important dimension since finding out causalities means finding correlation between the events occurring in sequence. Fig. 4 illustrates the "designer's view" of the interface limited to pictures, attached data and time. Here the 'photo reel' type of presenting prototypes is chosen because it instantly creates a connection between the designers' information and the actual artifact.

In the researcher's view interface, the user can choose what to display from the database: Only the photographs, or e.g. the usage of the machines. This is depicted in Fig. 5. Also, data-wise filtering is possible: A researcher can filter the data based on people, groups, machine usage, time or any dimension added to the repository. From this view, a researcher can easily see the quantities of the prototypes and whether a project is creating linear/sequential or parallel prototypes. The raw data is downloadable from the repository if a researcher would like to access it for other purposes than visualizing, for example, data mining of patterns inside data.

An important quality for the interface is how the creation, deletion, insertion and updating of the repository works. The intended workflow is to automatically create a data entry from a physical prototype. Then, by displaying an entry in the form of a picture, one can elaborate the most important qualities of a prototype (or question) straight in the repository.

The hypothesis is that the users will find the best ways to leverage the repository accordingly. That is why the data model inside the repository should not be fixed and thus new fields of data can be added. This way the usage of the repository will emerge as needed by the project at hand. Each picture of a prototype is connected to a project and a person—and vice-versa.

In the next section, we will elaborate one input method of semi-automatically inserting data to the repository: a prototype-capturing device named 'Protobooth'.

VI. CAPTURING OUTPUT FOR THE REPOSITORY – PROTOBOOTH IN DETAIL

To lower the threshold for using the repository, we have created a prototype system that has instant access to create data entries in the repository. It is a physical booth that is situated in a research laboratory, located in NTNU (Norwegian University of Science and Technology). In this section, we elaborate on the design decisions and rationale behind component and system choices. The Protobooth and its RFID user interface is depicted in Fig. 6.

Fig. 6. Picture of the Protobooth prototype and its interface

A. *The workflow*

The workflow is simple and it should take less than 10 seconds to operate the instrument. After (or while) using the laboratory, the users would set their prototype inside the Protobooth and show their own RFID access cards (provided by the organization for everyone) to the RFID reader that would ignite the photographing process of two webcams. Everything else happens automatically from this point on. The pictures are uploaded to the repository server and a data entry of the metadata is populated with the information of the time and user. At any given time, the users can view and modify their entries to add more detailed descriptions in addition to the pictures, i.e. more traditional documenting of the project through the web interface.

B. *Hardware of the Protobooth*

The prototype system of the Protobooth has the following components:

- Fabric on a wooden frame
- Logitech webcam 2x
- IKEA Lamp
- USB router as power supply
- Parallax RFID reader
- Arduino Uno
- RaspberryPi 3 model B
- Tplink WiFi router

A small semicircular enclosure is built to provide a standard background for the photos. The enclosure is attached to a table on wheels to give users a more rigid yet easy-to-move experience. Two cameras are used to gain a close to 360-degree view of the photographed prototypes. The RFID reader was chosen since it matches the existing protocol of the access cards of the building. The interface for the RFID reader was connected to an Arduino Uno, which was linked through a serial connection to a RaspberryPi that handles all the outgoing data traffic within a Python framework.

C. *The Database, the Foundation of the Repository*

The prototype repository and interface was created with:

- MongoDB database, running on a Debian7 Linux server
- Node.js, Express.js and React, as a visualizing front-end

The MongoDB database acts as the foundation for the repository where Protobooth is inserting its data. It gathers all the information required for visualizing the documentation of the prototypes. MongoDB is a NoSQL document database that can accept very different kinds of inputs. For now, it has a data structure for the photos, as well for the user identities. In the user collection, the projects, people and access card IDs are connected and, as mentioned earlier, any of those can be used as filters in the user interface. Following our approach, one can add any given data (not only pre-defined) as the input variables, such as tool usage, who was present in the laboratory, or material consumption.

VII. Current Status and Preliminary Results

At the time of writing this paper, the described research setup has been pilot tested for 3 months in our research laboratory, and has accumulated over 300 entries. These entries include mostly student projects, industry cases, as well as some sporadic noise. There are 50 students participating in the pilot testing, some of which are doing courses, while others are graduate students working on research topics and theses.

Pilot testing has shown that a low threshold for making entries ensure that the Protobooth is used more regularly. However, we see that annotating and editing entries happen far less regularly than the entries themselves, which indicate that the chosen approach for modifying input and annotating entries needs further improvement. Moreover, although the picture quality from the entries is sufficient for most uses, we aim at improving both lighting and camera quality, including adding multiple views (i.e. more cameras or the option to rotate the subject).

Although this paper is limited to using pictures for capturing artifacts, we imagine the possibility of implementing more technologies in the future. This may include—but is not restricted to—3D-scanning and video input. We also envision adding activity measurements from the laboratory environment, including machine and tool usage and interactions [19]. We are also investigating the use of artificial intelligence solutions to automatically connect different inputs to the according outputs.

VIII. The Future of the Research Repository

This paper outlines a conceptual and practical take on aiming to make an artifact and activity repository of fuzzy-front-end product development for use in both early stage product development research and practice. While the work detailed out here represents a small start for making such a repository project, we argue that there are still many features and considerations that need to be addressed in the future.

By mapping causalities between activity and output in early-stage development projects, we seek to understand how to more effectively and efficiently face the uncertainty and vast solution spaces. Gathering data on both activity and output in product development is currently a cumbersome and time-consuming process, and we want to gather this data in a nonintrusive and time efficient way as possible.

In addition, we expect several effects from creating and elaborating such a repository. Firstly, we hope to see an increase in laboratory activity after the users are starting to interact with the repository. Secondly, we expect to get a wider overview of the type of activity that are ongoing in this laboratory setting, broken down and decomposed into dimensions like time, activity, tool use, materials, and output.

There are several challenges that became apparent while working with this repository. As we are relying on capturing data of people interacting with a laboratory environment, keeping data both safe and available will be an important concern in the future. Additionally, such a repository must be continuously maintained, as we are aiming to capture large quantities of data simultaneously. Careful consideration of future expansions or modifications are also necessary, especially for keeping a low threshold for user inputs.

In this paper, we have emphasized capturing design artifacts as a proxy for learning and have limited this capturing to taking multiple-view photographs of prototypes. We do realize that only recording pictures as proxies for learning also pose some challenges. The benefits of using pictures is that pictures and drawings can be used for shape recognition and understanding principles. However, obvious downsides include losing tactile information about the artifacts, including material texture, structural integrity, flex, strength and 'feel'. Additionally, it remains to be defined how we can capture multiple states of an artifact; for example, from the case project how the tools look attached and detached. One solution might be to include several pictures of the same artifact, applying state labeling. This is something we intend to explore further. Moreover, we are currently exploring adding other sensory inputs, such as weight (load) and 3D-scanning.

Ultimately, we seek to understand how to handle uncertainty, ambiguous information, and vast solution spaces in early-stage product development by studying the designers' ability to learn (i.e. reflect and adapt). This paper has attempted to outline some of the practical challenges that–once overcome–will enable a wider set of research challenges to be addressed. With this, we aim to use the repository for further generating new hypotheses and research questions.

REFERENCES

[1] C. Herstatt and B. Verworn, "The 'fuzzy front end' of innovation," Working Papers / Technologie- und Innovationsmanagement, Technische Universität Hamburg-Harburg, 4, 2001.

[2] A. Gerstenberg, H. Sjöman, T. Reime, P. Abrahamsson, and M. Steinert, "A Simultaneous, Multidisciplinary Development and Design Journey – Reflections on Prototyping," in *Entertainment Computing* - ICEC 2015, K. Chorianopoulos, M. Divitini, J. B. Hauge, L. Jaccheri, and R. Malaka, Eds. Springer International Publishing, 2015, pp. 409–416.

[3] M. Steinert and L. J. Leifer, "'Finding One's Way': Re-Discovering a Hunter-Gatherer Model based on Wayfaring," Int. J. Eng. Educ., vol. 28, no. 2, p. 251, 2012.

[4] L. J. Leifer and M. Steinert, "Dancing with Ambiguity: Causality Behavior, Design Thinking, and Triple-Loop-Learning," in Management of the Fuzzy Front End of Innovation, O. Gassmann and F. Schweitzer, Eds. Cham: Springer International Publishing, 2014, pp. 141–158.

[5] A. Sutcliffe and P. Sawyer, "Requirements elicitation: Towards the unknown unknowns," in Requirements Engineering Conference (RE), 2013 21st IEEE International, 2013, pp. 92–104.

[6] I. Nonaka and H. Takeuchi, The Knowledge-Creating Company: How Japanese Companies Create the Dynamics of Innovation. Oxford University Press, 1995.

[7] J. A. B. Erichsen, A. L. Pedersen, M. Steinert, and T. Welo, "Using Prototypes to Leverage Knowledge in Product Development: Examples from the Automotive Industry," in 2016 IEEE International Systems Conference (SysCon 2016) Proceedings, Orlando Florida: IEEE, 2016, pp. 491–496.

[8] J. A. B. Erichsen, A. L. Pedersen, M. Steinert, and T. Welo, "Prototyping to Leverage Learning in Product Manufacturing Environments," Procedia CIRP, vol. 54, pp. 233–238, 2016.

[9] C. Kriesi, S. Balters, and M. Steinert, "Experimental Studies in Design Science and Engineering Design Science – A Repository for Experiment Setups," 85-1 Proc. Nord. 2016 Vol. 1 Trondheim Nor. 10th - 12th August 2016, 2016.

[10] M. B. Jensen, S. Balters, M. Steinert, and others, "Measuring Prototypes-A Standardized Quantitative Description of Prototypes and Their Outcome for Data Collection And Analysis," in DS 80-2 Proceedings of the 20th International Conference on Engineering Design (ICED 15) Vol 2: Design Theory and Research Methodology Design Processes, Milan, Italy, 27-30.07. 15, 2015.

[11] M. R. Bohm and R. B. Stone, "Product Design Support: Exploring a Design Repository System," pp. 55–65, Jan. 2004.

[12] M. R. Bohm, J. P. Vucovich, and R. B. Stone, "Capturing Creativity: Using a Design Repository to Drive Concept Innovation," pp. 331–342, Jan. 2005.

[13] S. Szykman, R. D. Sriram, C. Bochenek, and J. Racz, "The NIST Design Repository Project," in Advances in Soft Computing, Springer, London, 1999, pp. 5–19.

[14] S. Agostinho, S. Bennett, L. Lockyer, L. Kosta, J. Jones, and B. Harper, "An examination of learning design descriptions in a repository," Fac. Educ. - Pap. Arch., pp. 11–19, Jan. 2009.

[15] J. Wilson, P. Chang, S. Yim, and D. W. Rosen, "Developing a Bio-Inspired Design Repository Using Ontologies," pp. 799–808, Jan. 2009.

[16] A. Kossiakoff, Ed., Systems engineering: principles and practice, 2nd ed. Hoboken, N.J: Wiley-Interscience, 2011.

[17] O. Eris and L. Leifer, "Faciliating product development knowledge acquisition: interaction between the expert and the team," Int. J. Eng. Educ., vol. 19, no. 1, pp. 142–152, 2003.

[18] H. Sjöman, M. Steinert, G. Kress, M. Vignoli, and others, "DYNAMICALLY CAPTURING ENGINEERING TEAM INTERACTIONS WITH WEARABLE TECHNOLOGY," in DS 80-11 Proceedings of the 20th International Conference on Engineering Design (ICED 15) Vol 11: Human Behaviour in Design, Design Education; Milan, Italy, 27-30.07. 15, 2015.

[19] H. Sjöman and M. Steinert, "Development of a wearable system to capture team (n> 2) interactions in engineering design teams," 85-1 Proc. Nord. 2016 Vol. 1 Trondheim Nor. 10th-12th August 2016, 2016.