

# Designing a Wearable Mental Health Tracker: A Seven-Week Collaboration With a Health-Tech Startup

**Mehmet Erçin Okursoy**

Department of Industrial Design, TED University, Ankara 06420, Türkiye

## ABSTRACT

The potential of digital technologies enables us to shape and develop new approaches to healthcare practices. This paper illustrates the outcomes of a seven-week product design project carried out with senior year students in collaboration with a health tech start-up firm, UMAXLIFE. The company has developed a wearable device that tracks patients' physiological data to create evidence for psychotherapy sessions, which is helpful for both adopting an evidence-based approach to patient monitoring and creating an objective documentation of patient records. The studio project aimed to develop the next generation of the physical wearable device and to redesign the software component of the system. The objective of the project was to explore how industrial design approaches can transform a technologically driven prototype into a clinically appropriate and user-centered design concepts suitable for the needs of therapeutic processes. The seven-week project started with desk research, including a literature review with benchmarking of existing wearable health technologies. The research stage was followed by concept generation based on identified user needs, technical requirements, and workflows. The concepts are refined through design iterations and low-fidelity prototypes during the design detailing phase of the project, following the concept selection stage. In the final stage, project teams developed detailed product designs, including ergonomic considerations, technological capabilities, and product software user interface for tracking and documentation. This paper documents the studio process and discusses the resulting design outcomes in terms of ideation themes, design qualities, challenges, and the integration of technological and human-centered considerations. The project shows how collaborations with health technology companies can generate innovative product concepts while providing the learning outcomes for design students. It also highlights the contribution of industrial design approaches to the development of emerging health technologies toward usable, acceptable, and meaningful tools.

**Keywords:** Wearable health technologies, Medical product design, University-start-up collaboration

## INTRODUCTION

University – Industry Collaboration (UIC) is a driver of innovation and knowledge transfer for developing new technologies and creating economic value. Triple Helix Model (Cai & Etkowitz, 2020) mentions the relations between government, academy and industry on different models as statist, laissez-faire and balanced. These three models can be shortly mentioned as

Received March 30, 2026; Revised April 17, 2026; Accepted May 4, 2026; Available online June 22, 2026

© 2026 The Authors. This work is licensed under a Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 License.

For more information, see <https://creativecommons.org/licenses/by-nc-nd/4.0/>

levels of interaction and hierarchy between the three entities. The statist model positions the government as the leading body of controlling projects and other two bodies in knowledge generation. The three bodies are positioned separately in the laissez-faire model in parallel to the classic liberalism in which the bodies get in contact and cooperate at a modest level. The balanced model can be named as positioning these three bodies in more contact and lateral in hierarchy that they can perform other bodies roles such as creating new institutions as technology parks and business incubators in the academy.

Different scales of companies affect the process and potential outcomes of UIC. The collaboration is helpful for startup companies in the early stage of development in terms of benefiting from the resources of the university such as their expertise and experience (Tereshchenko et al., 2024). In addition, the agile workflow of micro and small scale start-ups promises benefits for academy compared to structured R&D partnerships. The benefit of the academy is simulating the process of R&D activities in their educational projects that allows students to experience the management of challenges in the project in a realistic approach in terms of their feasibility. Projects carried out solely with academic purposes are mostly structured on the expectations and aim of the courses. This approach is helpful for universities especially in the early stages of the education. However, the complexity of the problem should be addressed in the latter stages of the curriculum for training the students for their future professional life. The project management of these collaborations is helpful for students to structure the scope of their projects in the capabilities of project partner, academic staff, and student. Barriers and facilitators of UIC discussed in the studies by (Kleiner-Schaefer & Schaefer, 2022; O'Dwyer et al., 2023; Rossoni et al., 2024) which point out the problems in the UIC such as trust issues, cultural differences, systematic barriers and relational social capital. The studies show that the time period of the collaboration, the complexity of the project is important for overcoming these barriers. Starting with short term projects and increasing the level of complexity of the projects is mentioned as beneficial for developing successful collaborations.

In summary, the literature indicates that university–industry collaboration is shaped not only by institutional structure but also by the scale, maturity, and operational culture of the collaborating company. In the case of startup-oriented collaborations, the balance between agility and feasibility becomes particularly critical, especially within educational design projects that operate under short timeframes. The following section presents the project plan and seven-week studio schedule developed to structure the collaboration between the academic studio and the startup partner.

## **PROJECT PROCESS**

The project was developed in collaboration with the health-tech startup UMAXLIFE, which developed a wearable device for psychotherapists. The company has developed a wearable system designed to support psychotherapy sessions by capturing patients' physiological data and transforming it into insights for therapists via AI. The system aims to contribute to evidence-informed therapeutic practices by enabling objective documentation of patient

responses, while also reducing the operational workload of therapists, such as manual note-taking and session tracking. Currently, the product exists as a working prototype undergoing clinical validation, and the company is actively seeking international partnerships to expand its application in different contexts.

## **PROJECT TIMETABLE**

The studio project was as a seven-week process, following a predefined timetable consisting of sequential yet iterative stages. Given the limited duration, the project did not include an extensive field research or long-term user studies. Instead, the process was initiated through desk research and a detailed understanding of the existing device and its technological framework. In addition, a market search was carried out for analysing existing wearable products targeting healthcare applications. Due to the limitations in time period the project did not aim radically disruptive innovations, but rather to explore how industrial design approaches can enhance the existing system by creating added value through usability, interaction quality, and enhancing design qualities for adherence of therapeutic workflows. The emphasis was placed on refining and advancing the product from a design perspective.

The first week of the project focused on desk research activities. Students conducted literature reviews to understand psychotherapy processes and commonly used therapeutic methods. Benchmarking studies were also carried out on existing wearable healthcare devices focusing on technical aspects such as sensor types and system capabilities. The products in the consumer market are also included due to the fact that design qualities are more visible and dominant in the sector. The product focuses on trauma-related conditions according to the feedback given by the company which is also supported by the social responsibility projects with earthquake survivors.

Following the research phase, the process continued with concept development and detailing. In this stage, students generated and refined design proposals for the physical wearable device, while also developing low-fidelity mock-ups. The digital component supported by AI aimed analyzing therapy sessions and supporting documentation processes. During this phase, multiple design iterations were developed and two primary concepts were selected for presentation at the preliminary jury. Based on feedback, each team narrowed their focus to a single concept for further development. Teams could merge their concepts and use potential ideas in their final proposed concepts.

In the subsequent weeks, the selected concepts were developed in detail, addressing manufacturing issues for a health-tech start-up and key design qualities. The critiques emphasized ergonomics, aesthetic integration, and the quality of interaction within therapy scenarios. In addition, students focused on optimizing workflow efficiency and improving the usability of the digital interface, aiming to simplify complex interactions for therapists. The project concluded with the presentation of fully developed design proposals, demonstrating the integration of research insights, technical considerations, and user-centered design principles within a constrained studio timeframe.

## SELECTED STUDENT PROJECTS

The student projects developed within the studio were selected according to design concerns related to the performance and acceptance of the devices. These concerns were structured around four primary themes such as hygiene, wristband ergonomics, user adherence through fashion, and emotional comfort.

The majority of concepts addressed hygiene in the early ideation, recognizing that shared wearable devices used in repeated therapy sessions must ensure easy maintenance. Students proposed solutions such as modular strap systems, easy to maintain contact surfaces (Team 5) and materials that minimize skin irritation and contamination. These approaches reflect an understanding of the clinical context, where hygiene is not only a functional requirement but also a factor influencing user trust. Students are informed during the critiques that the cleaning must match the frequency of use and gaps between the sessions.

A set of concepts focused on wristband ergonomics, particularly the need for a secure and stable fit to ensure reliable sensor readings. Since physiological data collection depends on a tight skin contact, students explored adjustable fastening mechanisms, elastic materials (Team 6), and adaptive forms that accommodate different wrist sizes (Team 4). In addition, attachment of the wristband to the casing was designed in different ways such as using the wristband at the top of the casing for creating a pressing force to the ankle for the tight fit (Team 4). These proposals aimed to balance technical performance with comfort of fit.

Another group of concepts approached the device as a fashion-oriented accessory (Team 1) to improve user adherence. Recognizing that long-term experience of therapy is influenced by personal acceptance, students focused on aesthetic qualities of the wristband can be a tool for patients' adherence process. The concept is based on a scenario which the band is given to the patient that can be used in daily life as a bracelet. Thus the form is kept in a neutral minimalist form for covering the taste of the majority. This approach positions the wearable not only as a medical tool used in the medical environment but also in the daily life for accepting the therapy process as a part of their life.

Finally, some projects emphasized emotional comfort through form and interaction qualities. These concepts explored soft geometries, non-intrusive visual language, and calming tones in CMF (color, material, finish) to reduce potential anxiety associated with therapy monitoring (Team 3). Also two groups have developed their casing considering the capabilities of 3D printing (FDM), one of them used the layering as a form element (Team 2) and the other used the surface positioning in parallel with capabilities of achieving smooth surfaces (Team 11).

Collectively, the projects demonstrate how industrial design can address both functional and experiential dimensions, contributing to the effectiveness and adherence of wearable health technologies.

**Table 1:** Selected student projects.

Project Visual	Project Descriptions
 	<p><b>Team 1 Students:</b> Beliz Sinem Uzel, Eylül Deniz, Zeynep Öcal</p> <p><b>Design Feature:</b> The project uses the concept of using wristband as an accessory for enhancing the patient adherence.</p>
 	<p><b>Team 2 Students:</b> Cansın Er, Kerem Alsan, Mehmet Berk Kuru</p> <p><b>Design Feature:</b> The project is designed along with FDM printing layers as an aesthetic element in form</p>
 	<p><b>Team 3 Students:</b> Ayşe Nihan Aydos, Sıla Dağ, Yeşim Eren</p> <p><b>Design Feature:</b> Neutral tones and smooth surfaces are used for emotional comfort of the patient. Smooth surfaces also makes the cleaning process easier.</p>
 	<p><b>Team 4 Students:</b> Aslı Ecem Kudaş, İris Arslankılıç, Zeynep Sude Karabağ</p> <p><b>Design Feature:</b> The wristband is positioned on the top of the casing for achieving better fit.</p>
 	<p><b>Team 5 Students:</b> Ayşe Ece Liman, Bilge Poçan, İpek Yüksel</p> <p><b>Design Feature:</b> The smooth surfaces enable ease of cleaning along with discreet form for fluent therapy session.</p>
 	<p><b>Team 6 Students:</b> Carina Cemre Brutscher, Elif Kalabak, Rona Şükrü Yurdakan</p> <p><b>Design Feature:</b> Elastic wristband promises secure fit and comfort for the user.</p>
 	<p><b>Team 7 Students:</b> Cansu Selen Sir, Defne Güvendik, Ekinsu Koyuncu</p> <p><b>Design Feature:</b> The angled surfaces matches with the FDM boundaries and manufacture of smooth surfaces.</p>

## CHALLENGES IN THE PROJECT

The challenges encountered in the student projects were largely related to developing design concepts compatible with the constraints of a micro-scale health-tech startup, particularly in terms of manufacturability, assembly, and resource availability. Unlike large-scale global firms, the collaborating company, UMAXLIFE, does not have a production facility and relies on outsourced production. In addition, the development of the accompanying application that is responsible for tracking sessions and generating reports for therapists introduced further complexity.

### Challenges Related to the Wearable Device Design

A primary challenge identified during the studio process was aligning design proposals with the production capabilities of a micro-scale company. The company can source standard components such as sensors, batteries, memory units, and printed circuit boards (PCBs) from external suppliers, but cannot develop highly integrated custom components. This limitation affects the physical design of the wearable device. In contrast to benchmark products developed by global companies, which benefit from miniaturized and integrated electronics, the concepts needed to use relatively larger components. While this constraint reduces compactness, it also creates opportunities for industrial designers to explore more expressive and differentiated product forms. In this sense, avoiding highly minimalist and generic form factors as in common mass-produced electronics became a design objective for creating original form language.

Another important challenge was the initial investment required for production. High-cost manufacturing processes such as injection molding and large-scale assembly operations are not feasible for companies operating at this scale. As a result, the studio encouraged the use of rapid manufacturing techniques, particularly 3D printing, combined with standard materials and off-the-shelf components for the wristband. However, this approach has created a challenge for the students. While additive manufacturing allows flexibility in prototyping and low-volume production, it falls behind in terms of precision and mechanical performance compared to injection-molded parts. Consequently, students needed to carefully consider component sizes, fastening mechanisms, and assembly details for feasibility. Additionally, the use of widely recognizable components associated with certain model smartwatches was discouraged in order to maintain originality and avoid direct formal resemblance to existing products.

The use of advanced components such as screens or high-cost technologies was also critically evaluated. Considering the wearable device functions as a data collection tool, the inclusion of such features was considered unnecessary and potentially disruptive to therapy sessions. Instead, subtle feedback mechanisms, such as LED indicators, were preferred to provide a fluent interaction between the therapist and the patient during the sessions.

## Challenges Related to the Application Design

The development of the accompanying application introduced a distinct set of challenges, primarily related to data privacy, user roles, and functional scope. One of the most critical concerns was the protection of sensitive patient data generated during therapy sessions. Initial design ideas often positioned patients as active users of the system. However, this approach raised concerns regarding data security and access control. In response, the user structure of the application was redesigned, positioning psychotherapists as the primary users, supported by administrative staff such as assistants responsible for scheduling and communication tasks. This resulted with the development of interface structures with predefined access levels and partitioned information displays, ensuring that patient data remains discreet and protected within clinical environments.

Another key challenge was reducing the cognitive and operational load of the therapists. The main function of the system is to create the transcript of the session and provide meaningful insights matching the significant physiological data in parallel with the conversation. Therefore, the application needed to be designed with a high degree of simplicity and clarity. Students focused on minimizing the complexity, organizing information hierarchically, and presenting data in ways that highlight relevant patterns without overwhelming the therapist.

An issue concerned about the boundaries of the application's role within the therapeutic process. It was essential to position the system as a supportive tool rather than a decision-making entity. The responsibility for diagnosis and treatment still remains with the therapist, in terms of professional, legal and ethical issues. This distinction also points out the position of the company as a technology provider rather than a healthcare authority because the company does not have the healthcare workforce for controlling these issues. As such, the application designs needed to communicate this boundary clearly, avoiding features that could be interpreted as replacing clinical experts.

## CONCLUSION

The challenges mentioned above show the interaction between technological constraints, design decisions, and healthcare requirements. The student projects demonstrate the potential of design to contribute to the development of health technologies by improving usability, improving clinical workflows, and enhancing acceptance of new technologies. In this context, design plays a critical role in humanizing technology, enabling the integration into real-life contexts.

From an academic perspective, the collaboration also provided significant educational value. The project enabled students to experience the logic of a startup, including its approach to technological development, resource constraints, and feasibility considerations. Beyond the project brief, the project partner shared insights from their own journey, particularly regarding the challenges of expanding technological applications into new domains.

These experiences showed students the practical issues of professional life, such as funding processes, scaling strategies, and the uncertainties inherent in early-stage ventures. In short, the collaboration functioned not only as a design studio project but also as a form of mentorship, offering students a grounded understanding of how design ideas can be translated into viable products within real-world constraints.

## ACKNOWLEDGMENT

The author would like to thank UMAXlife and part-time instructors of ID401 course Büşra Kaboğlu and Gökhan Çetinkaya for their support in the project. In addition, the author would like to thank all ID401 students for their effort and hardwork in the project especially designers of selected projects (Aslı Ecem Kudaş, Ayşe Ece Liman, Ayşe Nihan Aydos, Beliz Sinem Uzel, Bilge Poçan, Cansın Er, Cansu Selen Sir, Carina Cemre Brutscher, Defne Güvendik, Ekinsu Koyuncu, Elif Kalabak, Eylül Deniz, İpek Yüksel, İris Arslankılıç, Kerem Alsan, Mehmet Berk Kuru, Rona Şükrü Yurdakan, Sıla Dağ, Yeşim Eren, Zeynep Sude Karabağ, Zeynep Öcal).

## REFERENCES

- Cai, Y., & Etzkowitz, H. (2020). Theorizing the Triple Helix model: Past, present, and future. *Triple Helix* 7 (2-3), 189–226. <https://doi.org/10.1163/21971927-bja10003>
- Kleiner-Schaefer, T., & Schaefer, K. J. (2022). Barriers to university–industry collaboration in an emerging market: Firm-level evidence from Turkey. *Journal of Technology Transfer*, 47(3), 872–905. <https://doi.org/10.1007/s10961-022-09919-z>
- O'Dwyer, M., Filieri, R., & O'Malley, L. (2023). Establishing successful university–industry collaborations: barriers and enablers deconstructed. *Journal of Technology Transfer*, 48(3), 900–931. <https://doi.org/10.1007/s10961-022-09932-2>
- Rossoni, A. L., de Vasconcellos, E. P. G., & de Castilho Rossoni, R. L. (2024). Barriers and facilitators of university–industry collaboration for research, development and innovation: a systematic review. *Management Review Quarterly*, 74(3), 1841–1877. <https://doi.org/10.1007/s11301-023-00349-1>
- Tereshchenko, E., Salmela, E., Melkko, E., Phang, S. K., & Happonen, A. (2024). Emerging best strategies and capabilities for university–industry cooperation: opportunities for MSMEs and universities to improve collaboration. A literature review 2000–2023. In *Journal of Innovation and Entrepreneurship* (Vol. 13, Number 1). Springer Science and Business Media Deutschland GmbH. <https://doi.org/10.1186/s13731-024-00386-4>