在设计挑战中。我们从探讨气候变化出发，我们通过脑力风暴提出了多样的初步想法，展示了对问题的广泛理解。在运用QOC方法细化这些想法后，我们的焦点转向了教育行业内的回收行为。并深入研究相关论文增强了我们对这一领域现状和挑战的认识，这直接指导了问卷的设计。我们的问卷特别针对教育行业内的回收问题，旨在深入了解不同用户群体在回收习惯、知识和挑战方面的情况。为了更好的了解用户，问卷的核心思路是以用户为中心来设计的。在设计过程中我确保了问卷每个问题都清晰和相关，以防止误解和摸棱两可的问题出现。并维持问卷的顺序逻辑紧密聚焦，这能使受访者填写时感到更加轻松不会因为不相关的问题导致失去兴趣。确保了问卷设计简洁，完成时间控制在2-4分钟内，并在调查中已明确指出预计的完成时间，这有助于提高响应率。同时，问卷中的问题不仅提供了所需的封闭式还提供了一定的开放性，以增加整个问卷的灵活性并深入了解用户的真实想法。所有回应均匿名和保密，确保了数据的真实性和可靠性。这个过程不仅展示了我们对问卷设计的精心考虑，更重要的是，它凸显了以用户为中心的设计方法论在实际应用中的有效性。

在我们的问卷设计中，我将其分为四个部分，以全面捕捉教育领域内的回收问题。首先，我专注于了解受访者的角色和回收态度，因为这是理解他们行为的关键，为后续问题提供了必要的背景。然后，我转向探究受访者的回收习惯和知识，这有助于评估受访者在日常生活中参与回收的方式，以及受访者识别可回收和不可回收物品的能力，从而指导我们是否需要在解决方案中增加教育指导的成分。接下来，我调查了社区成员对学校回收设施的可及性，以及他们对参与回收活动的兴趣。这部分旨在评估回收设施的可达性和用户的参与意愿，既收集了关于设施可及性的实际数据，也理解了他们对回收活动的想法。最后，我专注于识别受访者认为的回收过程中的主要挑战和提高回收率的有效方法，主要寻求用户主观认为的问题与解决方案。通过这样的结构化问卷设计，我们不仅系统地收集了有关教育行业内回收问题的深入信息，而且对如何有效地解决这些问题获得了更清晰的视角。这一过程突显了我们在确保问卷紧密聚焦于关键问题的同时，也充分考虑了用户需求和行为，为制定具有针对性的解决策略提供了坚实的基础。

在处理问卷调查的数据时，通过Google Forms生成的饼图结果格式未能直观地展示不同教育领域成员的多样看法。为了解决这个问题，我选择使用收集到的受访者回复的CSV文件，并利用Python绘制了四个部分，分别对应不同教育领域成员的观点。这种方法可以使我无需为每个教育领域的成员单独设计一份问卷，就能够有效地获得所需数据。不仅节省了设计和分发多份问卷的时间，还提高了我们从数据中提取有用信息的能力。从根据收集到的数据可视化后发现大学用户比中小学用户表现出更积极的回收态度和行为，而中学生在回收热情和知识方面稍显不足，尤其在识别可回收物料方面存在困难。此外，大学和小学的用户能更积极地使用回收设施，中学用户使用这些设施就相对困难。这些数据证实了之前我们提出的教育行业内确实存在一定的回收问题而这个领域主要是中学基于这些采访的数据，我们进行又进行了深入的采访，以更好地证实中学回收的具体需求和挑战。最终这些信息指导了我们设计解决方案的方向，其在提高中学生的回收意识和改善回收设施的可及性方面。

仔细反思UCD共情阶段的问卷调查过程，我学到了对用户需求理解的重要性。这个过程告诉我，深入洞察用户的实际行为和态度是设计有效解决方案的关键。我学会了如何从用户反馈中提取有价值的数据，并将这些数据转化为具体的设计行动。更重要的是，这一过程强化了我将用户置于设计中心的思维方式，明白了设计不仅是创造性的表达，也是对用户需求深刻理解和响应的过程。

在我们的设计挑战中，UCD的共情阶段对问卷调查的设计产生了重要影响。我们从气候变化的主题出发，通过脑力风暴产生了一系列初步想法，这些想法展示了团队对问题的多元理解和可能的解决方案。进一步运用QOC方法来细化这些想法时，这促使我们聚焦于回收和教育行业之间的关系。接着，通过深入研究相关论文，我们对回收在教育行业领域的现状和挑战有了更深刻的理解。这个过程直接影响了我们问卷调查的设计。我们不再只是泛泛地探讨气候变化，而是具体地关注在教育行业内的回收行为和挑战。我们的问卷因此被设计为深入了解特定用户群体。此问卷的目的是深入了解各校园社区成员在回收方面的习惯、知识、兴趣和所面临的挑战，可以使我们更细节的了解到教育行业用户的具体想法。在设计过程中为了贯彻以用户为中心我确保了以下几点：首先，问题和答案都是清晰而不是摸棱两可的，为了防止任何可能的误解；其次，仅提出与回收有关的相关问题，确保问卷内容的紧密聚焦并且顺序具有逻辑性，这能使受访者填写时感到更加轻松不会因为不相关的问题导致失去兴趣；再次，问卷被设计为在2-4分钟内完成，且在调查中已明确指出预计的完成时间，这有助于提高响应率；此外，问卷不仅提供了所需的封闭式问题还提供了在调查结束时提供开放性反馈的机会，这样的设计可以更好的增加整个问卷的灵活性并更深层的了解用户的想法；最后，所有回应都是匿名和保密的，这对于确保数据的真实性和可靠性至关重要。

During the empathic phase of the UCD lifecycle, we started by exploring the issue of climate change. Through brainstorming, we generated a variety of preliminary ideas, demonstrating a broad understanding of the issue. After refining these ideas with the QOC method, our focus shifted to recycling behaviors within the education sector. Deepening our knowledge through literature research on this field's current status and challenges directly influenced our survey design. Our questionnaire, specifically targeting recycling issues within the educational sector, aimed to explore the recycling habits, knowledge, and challenges of different user groups. To better understand the users, the core idea of our survey was centered around user-centric design. In the design process, I ensured that each question in the survey was clear and relevant, preventing misunderstandings and ambiguities. By maintaining a logical and focused sequence, the survey was designed to be user-friendly, keeping respondents engaged without losing interest due to irrelevant questions. We ensured the survey was concise, with a completion time of 2-4 minutes, which was clearly indicated, to improve the response rate. Additionally, the survey included both closed and open-ended questions to enhance its flexibility and gain deeper insights into users' true thoughts. All responses were kept anonymous and confidential to ensure the authenticity and reliability of the data. This process not only showcased our careful consideration in survey design but more importantly, it highlighted the effectiveness of user-centered design methodology in practical application.

In our survey design, we divided it into four parts to comprehensively capture the recycling issues within the educational sector. Firstly, I focused on understanding the respondents' roles and attitudes towards recycling as this is key to understanding their behavior and provides necessary context for subsequent questions. Next, I explored respondents' actual recycling habits and knowledge, which was crucial in assessing how they participate in recycling in their daily lives and their ability to distinguish between recyclable and non-recyclable items. Following this, I surveyed the accessibility of school recycling facilities and the interest of community members in participating in recycling activities. The final part was focused on identifying the main challenges in the recycling process and the most effective methods for increasing recycling rates as perceived by the respondents. This structured questionnaire design allowed us to systematically collect in-depth information on recycling issues within the education sector and provided a clearer perspective on how to effectively address these issues. This process underscored our commitment to focusing the questionnaire on key issues while also thoroughly considering user needs and behavior, providing a solid foundation for devising targeted solutions.

When processing the data from the survey, the pie chart results generated by Google Forms did not adequately display the diverse views of members from different educational sectors. To address this, I opted to use the CSV file of respondents' replies and utilized Python to create visuals for each of the four parts, corresponding to the viewpoints of members from different educational sectors. This approach allowed us to efficiently gather the necessary data without designing separate surveys for each sector, saving time in designing and distributing multiple questionnaires, and enhancing our ability to extract useful information from the data. Visualization of the collected data revealed that university users showed more positive attitudes and behaviors towards recycling compared to primary and secondary school users. Middle school students, in particular, showed a lack of enthusiasm and knowledge about recycling, especially in identifying recyclable materials. Additionally, while university and primary school users were more proactive in using recycling facilities, middle school users found these facilities relatively difficult to access. These findings confirmed our initial proposition that there are indeed recycling issues within the educational sector, particularly in middle schools. Based on this data, we conducted further in-depth interviews to better ascertain the specific needs and challenges of recycling in middle schools. Ultimately, this information guided the direction of our solution design, focusing on improving recycling awareness among middle school students and enhancing the accessibility of recycling facilities.

Reflecting on the empathic phase of the UCD survey process, I learned the importance of understanding user needs. This process taught me that deep insights into users' actual behaviors and attitudes are key to designing effective solutions. I learned how to extract valuable data from user feedback and translate this data into concrete design actions. More importantly, this process reinforced my mindset of placing users at the center of the design process, realizing that design is not only a creative expression but also a process of deeply understanding and responding to user needs.

在UCD生命周期的共情阶段，我们从探索气候变化问题开始。 通过头脑风暴，我们产生了各种各样的初步想法，展示了对问题的广泛理解。 在用QOC方法细化这些想法后，我们的重点转移到教育部门内的回收行为。 通过文献研究加深了我们对这一领域现状和挑战的认识，这个过程帮助我们形成了一个核心假设：不同教育阶段的用户群体可能对回收有不同的态度和行为。 本问卷针对教育领域内的回收问题，旨在探索不同用户群体的回收习惯、知识和挑战，旨在验证我们的假设并深入理解这一问题。为了更好地了解用户，我设计问卷的核心思想是以用户为中心的设计。在设计的过程中，我确保问卷中的每一个问题都是明确的和相关的，避免误解和歧义。通过保持一个有逻辑性和重点的顺序，问卷被设计成用户友好的，保持受访者的参与，而不会因为不相关的问题而失去兴趣。 为提高回复率，问卷制作简洁，完成时间为2-4分钟，并在调查中明确预期时间。 此外，问卷包括封闭式问题和开放式问题，以增强问卷的灵活性，更深入地了解用户的真实想法。 所有回复均保持匿名和保密，以确保数据的真实性和可靠性。 这一过程不仅体现了我在问卷设计时的认真思考，更重要的是突出了以用户为中心的设计方法论在实际应用中的有效性。