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Research Article

Fostering well-being in emerging adults through prosocial behavior: an intervention design proposal for higher education

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Abstract

This study presents a design and methodology paper that proposes a structured, theory-driven educational intervention to support prosocial behavior in emerging adulthood. Well-being is closely linked not only to individual satisfaction but also to social connectedness and resilience. Prosocial behaviors—deliberate acts of helping, sharing, and supporting others—emerge as fundamental determinants of both individual and collective well-being in this context. Emerging adulthood (ages 18–25) represents a critical developmental stage in which identity exploration and the formation of social roles take place, thereby offering an essential opportunity for educational interventions aimed at fostering prosociality. However, the literature reveals a scarcity of concrete applications specifically designed for this age group within the context of higher education. Addressing this gap, the present study aims to develop and propose a structured, theory-driven educational intervention that integrates design-based approaches with psychological frameworks to support prosocial behavior in emerging adulthood. This study proposes a 14-week course plan that integrates Participatory Design, Design Thinking, and Positive Psychology approaches to enhance university students' prosocial motivation. The COM-B model (capability, opportunity, motivation) and Self-Determination Theory (autonomy, competence, relatedness) constitute the theoretical foundation of the intervention. The unique contribution of this study lies in combining design education methodologies with behavior change theories to offer a scalable and practice-oriented intervention model tailored for higher education contexts. The research will be conducted using a quasi-experimental design with both experimental and control groups. Quantitative data will be collected through the VIA Character Strengths, Adult Prosociality, Basic Empathy, Psychological Need Satisfaction, PERMA well-being, and General Belongingness scales. In contrast, qualitative data will be obtained through interviews and focus group studies. The evaluation of the intervention's impact will be conducted in the subsequent main study, following the methodology proposed in this article.

1. Introduction

Well-being is defined as a multidimensional concept encompassing overall life satisfaction, the experience of positive emotions, and the perception of one's life as part of a meaningful whole. This phenomenon is not limited to individual psychological experiences but is also closely tied to the strength of social bonds and mutual trust within society [1–3]. The bonds individuals establish with themselves and their communities can even surpass basic physical needs as the strongest

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determinants of happiness and life satisfaction [4,5]. The most visible manifestation of such bonds emerges in prosocial behaviors. Historically, these behaviors have played a crucial role in ensuring survival and the continuation of generations, while also fostering a sense of belonging in society, serving as a cornerstone of social cohesion [6,7].

Prosocial behavior is defined as deliberate actions aimed at benefiting others. It includes not only cooperation but also voluntary acts such as donating, sharing, and helping those in need. [8–11]. Prosocial behaviors are considered indicators of sensitivity and care for others, as well as social well-being. Research highlights their positive associations with serotonin [12] and oxytocin [13] and points to their stress-regulating functions in cancer patients [14]. Furthermore, studies during the COVID-19 pandemic have emphasized the positive relationship between prosocial participation and individuals' sense of belonging, trust, and overall life satisfaction [15]. Within this framework, prosocial behaviors are viewed as significant behavioral outcomes for both individual and social health [16,17], serving as indicators of physical and psychological well-being [18]. While these concepts are closely interrelated, this study distinguishes prosocial behavior as a behavioral outcome, empathy as a cognitive–affective process, and social connectedness and well-being as broader psychosocial constructs.

Three initiating factors are necessary for an individual to engage in prosocial behavior: recognizing that another person needs help, perceiving this need accurately, and feeling self-efficacious in responding to it [19]. Earlier research focused primarily on "disadvantaged groups," whereas current studies have shifted toward the "motivational" dimension of prosociality. Thus, the central question has evolved from "How can disadvantaged groups be reached?" to "How can groups be motivated to help the disadvantaged?" In this sense, understanding another person's situation and engaging in action based on one's perceived competence constitutes a form of decision-making behavior [7], closely tied to social connectedness. Communities with higher social connectedness can more effectively facilitate access to support and resources. Lenzi et al. [20] argue that environmental social cohesion strengthens individuals' ties with their surroundings and encourages civic participation, suggesting that civic engagement can sometimes be viewed as a reflection of prosocial behavior. From this perspective, social cohesion is considered a crucial factor influencing community participation and promoting positive social behaviors [21].

This study conceptualizes its target group within the framework of emerging adulthood [22], which is recognized in psychological literature as a distinct developmental stage positioned between adolescence and adulthood, characterized by identity exploration, instability, and the development of social roles. Emerging adulthood (ages 18–25) is defined as the developmental phase following adolescence, during which individuals begin to assume adult roles such as career, marriage, and parenthood, often within the context of higher education [22]. During this period, young adults form new social networks and, for many, start living independently of their families. The autonomy gained through separation from family supports decision-making and perspective-taking, while the increasing importance of peer relationships contributes to the development of prosocial behavior [23–28].

Although this developmental stage entails risks such as a tendency toward risky behaviors, it is also seen as an opportunity to cultivate social responsibility through prosocial actions and positive guidance [29]. Prosocial behaviors in emerging adulthood are associated with a reduced likelihood of substance use [26] and improved physical and psychological health [16,30,31]. They also contribute positively to academic success [32], social competence, and the formation of healthy relationships [18,33]. Furthermore, groups with higher levels of prosociality demonstrate stronger identity formation, greater self-worth, fewer depressive symptoms, and higher overall prosocial engagement [34]. These findings suggest that prosocial behavior supports the development of positive and supportive relationships, thereby enhancing social well-being. Consequently, emerging adulthood represents a critical period for promoting engagement in prosocial activities [35].

Prosocial tendencies are observable from early developmental stages, and education plays a significant role in fostering prosocial development. Among university students, prosociality has been shown to increase alongside cognitive development [27,36]. Emerging adulthood,

characterized by identity formation and social role exploration, represents a particularly critical period in which educational interventions can effectively shape prosocial tendencies. In this context, structured educational programs can support individuals in developing self-awareness, strengthening social connections, and enhancing overall well-being. However, despite the recognized importance of this developmental stage, existing research predominantly focuses on earlier periods such as infancy, childhood, and adolescence, leaving emerging adulthood relatively underexplored in terms of how prosocial behavior can be systematically supported [27,39–42].

Within the field of psychology, it has been noted that motivational approaches to prosociality often remain abstract and insufficiently translated into tangible experiences, limiting their practical applicability [43]. Sustaining prosocial behavior requires transforming these abstract principles into engaging and experience-based processes. In this context, product design education—emphasizing empathy, user-centered thinking, and solution-oriented development—offers a valuable framework for operationalizing prosocial behavior. Therefore, integrating prosociality-focused education with design interventions in higher education provides a promising pathway for embedding prosocial behavior into structured, experiential learning environments, thereby fostering resilience, empathy, and community participation among emerging adults.

Despite the growing body of research on prosocial behavior and well-being, existing studies predominantly focus on psychological or educational interventions in isolation, often lacking concrete, practice-oriented frameworks that translate prosociality into structured learning experiences within higher education. In particular, the integration of design-based approaches with prosocial behavior development remains underexplored. While design thinking emphasizes empathy and user-centered problem solving, its potential to systematically foster prosocial motivation and behavior has not been sufficiently articulated in the literature. Addressing this gap, the present study proposes a novel intervention model that combines participatory design, design thinking, and positive psychology within a course-based structure. This integrated approach aims to operationalize prosocial behavior as an experiential and design-driven learning process, thereby offering a scalable and practice-oriented contribution that extends beyond existing theoretical and educational models.

This study aims to enhance the prosocial motivation and well-being of emerging adults through education, focusing on the development of a semester-long, course-based intervention. The course first aims to cultivate awareness of the fundamental dynamics of prosocial behavior. Subsequently, participatory design practices will be employed to facilitate interaction with recipient groups, while positive psychology interventions will support self-efficacy. Design Thinking, which shares a similar starting point with prosociality and centers on empathy, will be applied throughout the process. This holistic approach aims to enhance students' prosocial motivation throughout a 14-week intervention.

In addition, the study contributes to societal well-being by fostering prosocial motivation among emerging adults in higher education. Through active engagement in the prosocial design process, participants are expected to experience enhanced autonomy, competence, and relatedness, as defined by Self-Determination Theory. Given the established relationship between these psychological needs and prosocial tendencies, the intervention is expected to strengthen prosocial motivation. Accordingly, the conceptual research foci are summarized as follows:

- Examining the effect of design thinking on empathy and prosocial motivation
- Evaluating the impact of learning support on perceptions of competence and prosocial participation
- Investigating the contribution of positive psychology and VIA character strengths to self-perception and prosocial behavior
- Exploring the relationship between participatory design, basic psychological need satisfaction (autonomy–competence–relatedness), and belonging
- Determining the level of change in the PERMA dimensions (positive emotion, engagement, relationships, meaning, accomplishment)

- Analyzing the impact of group interaction during the process on overall belonging

In the following sections, prior research is reviewed from an interdisciplinary perspective, with concrete examples of applications presented. The design and methodological framework of the course intervention are then explained, followed by a discussion of the expected findings and contributions.

2. Related Studies

A comprehensive review of the literature reveals that interventions based on prosocial behavior among undergraduate students have been examined in relation to mental health and well-being outcomes. Systematic searches were conducted across various databases, and only studies written in English that directly involved prosocial behavior interventions and targeted undergraduate populations were considered. After excluding publications that did not meet the inclusion criteria, a total of seven studies (Table 1) were identified, with most of them conducted in the United States, followed by a smaller number in Canada and the Netherlands. While the majority of these studies were published in the last decade, earlier examples from the 1990s were also included [44].

Nelson and colleagues [45] conducted their study with undergraduate students from both the United States and Korea, aged between 17 and 27. Participants were randomly assigned to perform kindness with autonomy support, kindness without support, or placed in a control group. The intervention highlighted that autonomy and competence play crucial roles in strengthening prosocial behavior and improving well-being, aligning strongly with Self-Determination Theory (SDT). While this study contributed valuable cross-cultural insights, its limitation was the short time frame, which did not allow for evaluating the long-term sustainability of prosocial behaviors across different cultural contexts.

Wang and colleagues [46] investigated a sample of 74 U.S. adults (average age 23.9, predominantly female). The intervention required participants to perform at least two generous acts each week, documented through diary reflections, compared with a control group. The study found that both groups reported improved life satisfaction and well-being, suggesting that intentional acts of generosity combined with self-reflection can enhance positive outcomes. However, the absence of a significant difference between experimental and control conditions raised questions about whether the improvements stemmed from the intervention or from time and contextual influences. The small sample size further limited generalizability.

Wienes and colleagues [47] studied 222 Dutch university students to examine how the target of prosocial acts influences outcomes. Students were randomized into groups practicing kindness toward strong ties (family/friends), weak ties (acquaintances/strangers), or treatment-as-usual. The results indicated that acts directed toward strong ties significantly improved well-being, while prosocial behavior toward weak ties increased stress levels. This highlighted the nuanced role of relational closeness in prosociality. Nonetheless, the study primarily measured short-term outcomes, leaving long-term contributions of prosociality toward weak ties underexplored, despite their potential for building broader social capital.

Little's research [48] focused on U.S. college students engaged in altruistic, unpaid volunteer activities. Rather than manipulating an intervention, the study examined the relationship between prosocial personality traits and well-being. Findings demonstrated clear links between prosocial orientation, constructive thinking, and enhanced self-perceptions. This contribution enriched the understanding of personality-based predictors of prosocial development. Still, the lack of detailed demographic data and unspecified sample size constrained the reliability and generalizability of the conclusions.

Whillans and colleagues [49] assessed the impact of volunteering and prosocial involvement on well-being across samples of university students and young adults. Their findings showed that prosocial participation contributed to increases in life satisfaction and subjective well-being, reinforcing the view that volunteering offers psychological benefits beyond altruistic outcomes. A limitation, however, was the contextual sensitivity of the findings: the positive effects of

volunteering may depend on whether it is pursued voluntarily or perceived as obligatory, an aspect that was not deeply examined.

Stevick and Addleman [50] explored short-term volunteer experiences among U.S. college students. The research examined how temporary prosocial engagement influences self-perceptions and prosocial motivation. Results suggested that even brief volunteer activities positively shaped self-efficacy and prosocial orientation. The contribution of this study lies in showing that prosocial change can emerge even from limited interventions. However, the study did not track whether these changes endured over time, leaving the long-term stability of such effects uncertain.

Cheng [51] developed an experiential class project titled *FeedTheDeed*, implemented among psychology undergraduates. The intervention encouraged students to perform prosocial acts and share them via social media, turning kindness into both a behavioral and reflective learning process. This approach demonstrated how integrating digital platforms into higher education could boost engagement and concretize prosocial learning. The innovation was notable for linking prosocial education with modern communication tools. Yet, possible drawbacks—such as the risk of performative motivation through public posting—were not examined, limiting the study's exploration of unintended effects.

Taken together, the reviewed studies indicate that prosocial behavior interventions among undergraduate students generally lead to positive outcomes such as enhanced well-being, happiness, and empathy. These interventions are predominantly implemented through two main approaches: structured volunteering activities and small, self-initiated acts of kindness. While volunteering is associated with improved health and social connectedness, self-directed prosocial acts appear to be more effective in fostering autonomy and sustaining engagement over time. The recipients of such behaviors vary widely—from close social ties to strangers—highlighting the contextual diversity of prosocial experiences. However, despite these positive trends, the findings are not entirely consistent. In particular, externally imposed prosocial activities tend to reduce motivation and limit the overall impact of interventions. Moreover, a critical examination of the literature reveals several methodological limitations, including short intervention durations, small sample sizes, and a predominant reliance on quantitative measures. These limitations restrict a deeper understanding of participants' lived experiences and the long-term sustainability of prosocial behavior. Therefore, there is a clear need for more comprehensive, mixed-methods, and curriculum-integrated approaches that not only measure outcomes but also embed prosocial behavior within experiential and design-oriented learning processes in higher education contexts [44].

3. Theoretical Background

When examining the fundamental theories and dynamics influencing prosocial behavior, Susan Michie's COM-B model (Capability, Opportunity, Motivation, Behavior) stands out among widely accepted models in the behavior change literature, due to its guiding function, comprehensive scope, and applicability [52,54]. The model emphasizes that for a behavior to occur, the individual must first have a sense of capability regarding that behavior; in addition, the opportunity and motivation dimensions explain the conditions under which the behavior is enacted. Alongside this, the Self-Determination Theory (SDT), which provides a more detailed explanation of motivational processes, has also been prominent in the behavior change literature and in studies focusing on well-being [55,56].

3.1. Self-Determination Theory (SDT)

Self-Determination Theory (SDT) highlights three fundamental psychological needs: autonomy, relatedness, and competence (Fig. 1). The satisfaction of these needs is not only essential for well-being but also plays a decisive role in the emergence of prosocial behaviors [57]. Emerging adults tend to show higher levels of prosocial tendencies when they feel that their psychological needs are met. Research has shown that autonomy, in particular, is critical for prosocial behavior and is closely related to tendencies such as showing empathy and adopting different perspectives [58–64]. According to SDT, motivation exists on four levels, with intrinsic motivation being the most

effective and applicable across many areas of life [29,65]. In this framework, meeting individuals' needs for autonomy, relatedness, and competence contributes to both the development of intrinsic motivation and the support of prosocial behaviors.

Table 1. Prosocial behavior interventions among undergraduate students [44]

Reference	Country of Publication	Sample size/Demographics	Intervention & Main Findings
Nelson et al. [45]	USA (data also from Korea)	USA: n=104, age 17–24 (M=19.1), 61% women; Korea: n=114, age 18–27 (M=20.7), 46% women	Randomized to kindness with/without support, or control. Autonomy and competence are linked to improved well-being.
Wang et al. [46]	USA	n=74, age ≥18 (M=23.9), 84% women	Experimental intervention vs control. At least two generous acts per week, diary reflections. Both groups improved life satisfaction & well-being.
Wieners et al.[47]	Netherlands	n=222, M age=21.3, 74% women	Randomized to kindness toward strong ties, weak ties, or treatment-as-usual. Strong ties condition improved well-being, weak ties increased stress.
Little [48]	USA	not specified (college volunteers)	Examined altruistic, unpaid volunteer positions. Found links between prosocial personality traits and well-being.
Whillans et al. [49]	USA	Sample details not specified	Volunteering did not directly improve well-being. Highlighted the importance of motivation and participation context.
Stevick & Addleman [50]	USA	Sample details not specified	Short-term volunteer experiences improved self-efficacy and prosocial behavior, but long-term impacts were unclear.
Cheng [51]	Canada	Sample details not specified	"Feed the Deed" project: small acts of kindness increased happiness and positive emotions.

3.2. COM-B Model for Behavior Change

The COM-B model proposes that behavior emerges as the result of the interaction among three fundamental components: capability, opportunity, and motivation. Capability refers to an individual's capacity to perform a behavior and is divided into two types: physical (bodily skills and health) and psychological (knowledge and cognitive skills). Opportunity encompasses the environmental and social factors that facilitate or hinder the behavior; these are classified as physical opportunities (time, space, resources) and social opportunities (norms, social support). Motivation determines the individual's willingness to perform the behavior and is considered in two dimensions: reflective motivation (conscious intentions, goals) and automatic motivation (habits, emotions, impulses). The interaction of these three elements shapes the behavior itself [67].

At the second level of the COM-B model, intervention functions used to support behavior change are defined, including education, persuasion, incentivization, coercion, training, environmental restructuring, modeling, and enablement. At the third level, policy categories that facilitate the implementation of these interventions are outlined, such as communication and marketing, guidelines, fiscal measures, regulation, legislation, environmental and social planning, and service provision (Fig. 2). Within the course design developed in this study, the intervention functions emphasized are particularly education, training, modeling, and enablement.

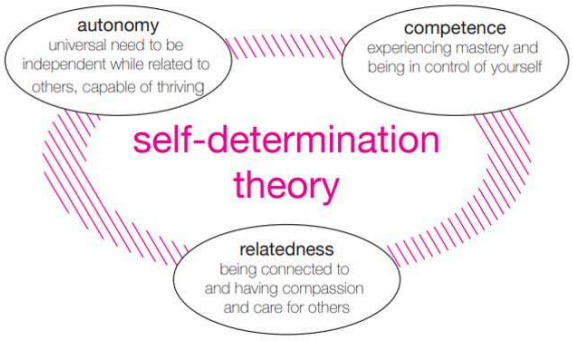

Fig. 1. Self-Determination Theory [66]

4. Methodology

This study, focusing on emerging adults in higher education, aims to strengthen design students' prosocial behavior motivation through a course-based intervention. The design challenge addressed within the course involves supporting first-year students in their integration into university life by developing prosocial solutions created by third-year students. In this way, the adjustment of first-year students is facilitated, while simultaneously enhancing the prosocial motivation of third-year students. Unlike many previous studies characterized by short-term interventions, the present study adopts a 14-week course-based structure to allow sufficient time for experiential learning, iterative design processes, and the gradual internalization of prosocial behaviors. This extended duration enables students to move beyond surface-level engagement toward sustained behavioral change. Furthermore, the participant group is embedded within an authentic higher education context, ensuring ecological validity while allowing the integration of prosocial behavior development into an existing curriculum. In this way, the study directly addresses key methodological limitations in the literature by combining extended duration with a contextually grounded and practice-oriented design.

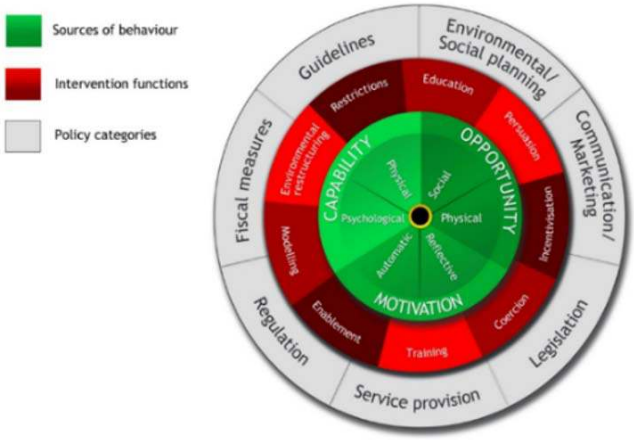

Fig. 2. Components of the COM-B Model for Behavior Change [67]

This intervention plan (Fig. 3) systematically illustrates the multilayered relationship between the theoretical framework and the expected outcomes. At the theoretical level, Self-Determination Theory (SDT) and the COM-B model serve as key foundations for explaining students' motivational processes and behavior change. At the course intervention level, the integration of prosocial behavior training, positive psychology, participatory design, and design thinking approaches enables the translation of these theories into tangible practices within the learning environment. These components are designed to enrich students' experiences of developing prosocial behavior through empathy, fostering belonging, engaging in creative problem-solving, and practicing collaborative learning. At the outcome level, the intervention is expected to strengthen students' prosocial motivation while simultaneously enhancing their overall well-being. As illustrated in the

framework, a holistic methodological chain is constructed—linking theoretical foundations to practical interventions and, ultimately, to behavioral and psychosocial outcomes.

4.1. Prosocial Behavior Education

Within the course, a dedicated instructional session on prosocial behavior aims to provide students with knowledge and awareness of prosocial behavior dynamics. At the end of the session, an online quiz conducted through the Mentimeter platform will be used to reinforce knowledge retention. This activity is designed to strengthen the capability component required for prosocial action. In addition, examples of prosocial behaviors that can be applied both among course participants and later in participatory design workshops will be discussed, allowing students to concretize the concept, practice behaviors, and reinforce them. In this way, physical and social opportunities are created to support prosocial action. These activities are expected to enhance students' perceived competence and foster a sense of belonging through group interaction.

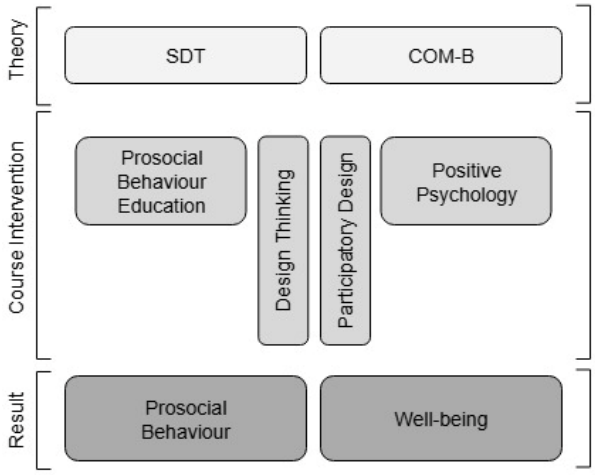

Fig. 3. Course Intervention Plan

4.2. Participatory Design

Although often regarded as a design method, Participatory Design is essentially a research approach. Its primary aim is not only to understand an existing practice but also to collaboratively envision, shape, and transcend it in ways that participants find meaningful [68]. Participants are not merely supporting actors but active contributors who enrich the diversity of knowledge and form an integral part of the design process. This allows tacit or embedded forms of knowledge to surface, bridging the analytical expertise of the designer with the experiential insights of participants.In the course, Participatory Design serves as a critical foundation for experiential learning of prosocial dynamics. First-year students will be involved as the participant group, sharing their needs and challenges based on their adjustment experiences to university life. Third-year students will act as the designer group, creating solutions that address these needs and support first-year students' integration into university life. Through this process, the fundamental prosocial steps of "observing a need, making sense of it, and responding to it" are turned into a concrete experience. Since full participation by all first-year students is not feasible, a representative group will be selected to voice their experiences. This structure ensures that tacit user knowledge (from first-years) is revealed and transformed by the designer group (third-years) into prosocial solutions. Thus, Participatory Design not only leads to more effective interventions but also strengthens students' self-efficacy, empathy, and sense of belonging.

4.3. Character Strengths Exploration Through VIA Inventory

According to Self-Determination Theory (SDT), intrinsic motivation and self-perception are critical factors for prosocial behavior [7,43,69]. Developing self-awareness is shown to positively impact psychological health and well-being [69]. Literature highlights the role of character strengths in enhancing individual well-being, social participation [40], and the link between prosocial behavior and self-efficacy [71]. Related constructs such as Self-Concept Clarity (SCC), self-efficacy, and

character strengths complement SDT by providing a broader lens to understand prosocial behavior in relation to identity development and well-being. Individuals with higher SCC—those who have a clear and consistent self-definition—are more likely to engage in prosocial acts, display self-confidence, and build stronger social relationships [72,73].

The VIA Character Strengths framework, developed by Seligman et al. [74], which measures 24 character strengths, is one of the most widely applied tools for identifying strengths. These strengths are universal across cultures, contribute to satisfaction and happiness, and represent moral values. They are measurable, distinct, and observable in varying degrees among individuals, including children and adolescents. Research shows that using character strengths fosters positive self-worth, enhances achievement capacity, and supports potential realization [75,76]. Thus, integrating VIA into the intervention allows students to recognize their unique strengths, reinforce self-efficacy, and cultivate prosocial orientations.

4.4. Design Thinking

For an individual to act prosocially, they must first understand the needs of others and empathize with them [7]. The design process similarly begins with empathy, enabling designers to create solutions that positively impact users' lives. In this respect, Design Thinking is considered one of the most suitable methods for addressing social innovation [77]. Design Thinking extends beyond traditional product design to tackle complex societal challenges. Its purpose is not merely to produce objects but to reimagine human experiences, interactions, and services. At its core lies empathy—since users may not always articulate their needs, designers must observe, interpret, and develop meaningful solutions. The approach encompasses five iterative stages: empathize, define, ideate, prototype, and test (Fig. 4). These stages form a cyclical process, continually refined through user insights. In the context of higher education, integrating Design Thinking offers students opportunities to build empathy, collaborate in problem-solving, and generate tangible outputs. By engaging in this human-centered process, students not only learn design as a skill but also internalize prosocial behavior through collaborative creation. This highlights the potential of Design Thinking as a driver for both educational outcomes and social well-being [78].

4.5. Methodology from the Perspective of COM-B and SDT

The prosocial behavior education embedded in the course is primarily intended to strengthen the capability component of the COM-B model. By increasing students' knowledge, awareness, and skills regarding prosocial behavior dynamics, their psychological and behavioral capacities are expected to improve. In this study, capability is primarily addressed in its psychological dimension (e.g., empathy, awareness, and perspective-taking), while physical capability—understood as bodily or motor capacity—is not directly targeted within the scope of the intervention. Instead, the physical learning environment, including the design studio and collaborative settings, is considered as part of the opportunity component. Classroom activities are designed to contribute to the opportunity dimension by providing contexts for practicing and reinforcing prosocial behaviors, while group interactions are anticipated to enhance motivation by fostering a stronger sense of belonging. This approach is likely to support the psychological needs of autonomy, competence, and relatedness identified by Self-Determination Theory (SDT). In this sense, the intervention aims to holistically address both the key elements of behavior change emphasized in COM-B and the psychological needs deemed critical for motivation and well-being in SDT.

The participatory design process is also expected to align closely with this theoretical framework. From a COM-B perspective, the needs expressed by first-year students render the opportunity dimension visible, while the design responses of third-year students are anticipated to strengthen capability and motivation. From an SDT perspective, the process is expected to enhance students' experiences of autonomy, competence, and relatedness—thereby supporting not only the quality of design outcomes but also prosocial motivation and well-being. In this way, participatory design functions not merely as a method but as a learning experience that operationalizes the dynamics of behavior change and motivation outlined in COM-B and SDT. The inclusion of positive psychology through character strengths education is assumed to complement this framework further. By

recognizing and utilizing their personal strengths, students are expected to increase their self-awareness, reinforce their sense of competence, and activate their potential more effectively. This process may also contribute to the fulfillment of autonomy, competence, and relatedness needs, thereby fostering prosocial motivation.

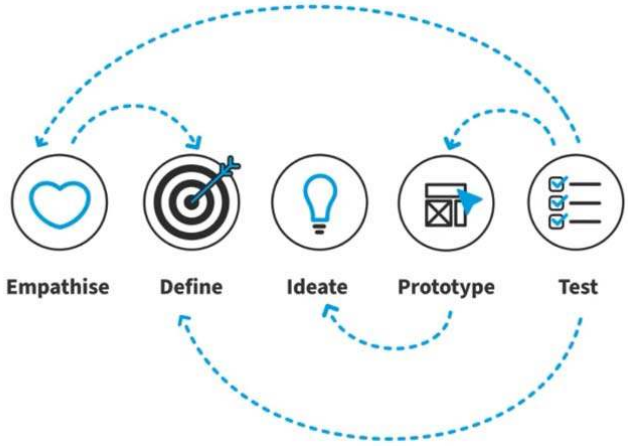

Fig. 4. Stages of Design Thinking [79]

Finally, the Design Thinking process is anticipated to intersect directly with both models. Within COM-B, the required elements for behavior—capability, opportunity, and motivation—find tangible expression across the stages of Design Thinking: empathy, problem definition, ideation, prototyping, and testing. The empathy and problem definition stages are expected to help students better understand user needs; the participatory design element creates social opportunities; and the prototyping and testing stages make behavioral outcomes visible, thereby enhancing motivation. From an SDT perspective, the process contributes to autonomy (active engagement in ideation), competence (hands-on problem-solving and prototyping), and relatedness (empathy and user interaction), thus nurturing the intrinsic motivation essential for prosocial behavior. The relationship between the approaches and methods integrated into the course design and the underlying behavior change theories is summarized in Table 2.

4.6. Data Collection and Analysis Plan

4.6.1 Quantitative Data Collection Tools

The course intervention will include two rounds of scale administration, one at the beginning and one at the end of the semester. This will enable a time-based comparison to assess the intervention's contributions by examining the differences between pre-test and post-test results. Five scales will be administered simultaneously to both the experimental group (students enrolled in the course) and the control group (students not enrolled in the course): the Adult Prosociality Scale, the Basic Empathy Scale, the Need Satisfaction Scale, the General Belongingness Scale, and the PERMA Profiler. In addition, the VIA Character Strengths Inventory will be administered once, exclusively to the experimental group, to raise awareness of individual strengths.

Participant Information Form: At the very beginning of scale administration, this form will ensure anonymity by assigning IDs to participants, while also collecting demographic and personal information (e.g., age, gender, year of study, living situation, economic conditions, social support). It will also include questions about psychological history, prior volunteering experiences, and stress levels, allowing for an analysis of the relationship between prosocial motivation and individual differences.

VIA Character Strengths Inventory: Developed by Peterson and Seligman [80], this instrument measures 24 character strengths and is widely validated across cultures. In this study, the VIA Institute on Character's Researcher Dashboard will be used for its online administration and

automatic reporting features. The test is expected to enhance students' positive self-perceptions during the intervention.

Table 2. Course intervention component– related model – contribution

Component/ Method	Targeted Component	Contribution
Prosocial Behavior Education	COM-B – Capability	Enhancing knowledge, awareness, and skills related to prosocial behavior dynamics
In-Class Activities	COM-B – Opportunity	Creating social environments and experiential opportunities for practicing and reinforcing behaviors
Group Sharing	COM-B – Motivation / SDT – Relatedness	Strengthening a sense of belonging, thereby increasing social motivation and connectedness
Participatory Design	COM-B – Capability, Opportunity, Motivation	Enabling students to identify needs and generate solutions; making opportunities more visible
	SDT – Autonomy, Competence, Relatedness	Supporting active participation, problem-solving experience, and strengthening social bonds through empathy
Positive Psychology/ Character Strengths	SDT – Competence, Autonomy, Relatedness	Increasing self-efficacy through recognition and use of strengths; supporting autonomy and belonging.
Design Thinking Process	COM-B – Capability, Opportunity, Motivation	Facilitating understanding of needs through empathy and problem definition; increasing motivation through prototyping and testing
	SDT – Autonomy, Competence, Relatedness	Supporting autonomy through idea generation, competence through prototyping, and relatedness through empathy

The course process was designed as a gradual and holistic structure that enables prosocial behavior to be experienced within the design process rather than merely learned conceptually. In the initial weeks, the aim was for students to understand the theoretical foundations of prosocial behavior, participatory design, and Design Thinking approaches. Self-awareness and motivational aspects were further supported through the VIA Character Strengths Inventory and example applications. This stage was structured as a cognitive preparation phase that provides a foundation for the "psychological capability" component of the COM-B model and the "autonomy" dimension of Self-Determination Theory (SDT).

In the following weeks, user experiences were made visible through empathy maps and needs analyses, enabling students to better understand the university adaptation processes of first-year students. This phase constituted a critical threshold for recognizing social opportunities and supporting the need for relatedness. During the second half of the process, ideation, prototyping, and testing activities were conducted. Students iteratively refined their solutions based on peer feedback and user interactions. These practice-based stages strengthened students' sense of competence while creating an iterative learning cycle that supports the transformation of motivation into behavior. Finally, the presentations and evaluation sessions conducted at the end of the semester reinforced the reflective dimension of the process and contributed to the internalization of the design activity as a prosocial learning experience.

Adult Prosociality Scale: Developed by Caprara et al. [81], this tool assesses prosocial tendencies, including helping, sharing, cooperation, and altruism. It will provide direct evaluation of the changes in prosocial motivation resulting from the intervention.

Basic Empathy Scale: Developed by Jolliffe and Farrington [82], this scale measures both cognitive and affective empathy, allowing for an examination of how empathy—an essential component of prosocial behavior—is influenced by the course intervention.

Need Satisfaction Scale: Developed by Deci and Ryan [83] within the framework of Self-Determination Theory, this instrument evaluates the satisfaction of basic psychological needs: autonomy, competence, and relatedness. It will assess how the intervention contributes to SDT's motivational processes.

General Belongingness Scale: Developed by Malone, Pillow, and Osman [84], this scale measures individuals' sense of social belonging. It will help determine whether students' group bonds and social connectedness are strengthened during the intervention.

PERMA Scale: Developed by Butler and Kern [85], based on Seligman's PERMA model, this scale evaluates five domains: positive emotion, engagement, relationships, meaning, and accomplishment. It will measure the effects of the intervention on students' overall well-being.

4.6.2 Qualitative Data Collection Tools

Semi-Structured Interview Form: This tool will be used to explore in depth the experiences of students in the experimental group, including their perceptions of the participatory design and design thinking processes, group interactions, and relational needs. It will also help assess the perceived impact of the course on prosocial motivation, empathy, autonomy, a sense of belonging, and positive emotions.

Observation Form: This tool will allow for direct observation of students' behaviors, group interactions, and prosocial tendencies during the course. It will provide real-time feedback on class dynamics, contributing to the identification of strengths and areas for improvement in the intervention.

4.6.3 Data Analysis

Quantitative data will be analyzed in SPSS using dependent and independent t-tests to compare scale scores between the experimental and control groups. This will allow not only for an assessment of changes in prosocial motivation but also for an examination of how these changes are reflected in related domains such as empathy, belonging, need satisfaction, and well-being. Qualitative data will be analyzed through descriptive content analysis using NVivo, providing contextual insights from students' experiences to complement quantitative results and offer a more holistic evaluation.

5. Expected Findings and Contributions

The proposed intervention is anticipated to contribute to enhancing prosocial motivation among emerging adults in higher education. Prosocial motivation, defined as the willingness to act in ways that benefit others, is considered an important factor in shaping social responsibility, collaboration, and community-oriented behaviors during early adulthood. By integrating structured educational activities that emphasize empathy, reflection, and collaborative engagement, the intervention is designed to provide opportunities for students to develop a deeper awareness of their impact on others and their surrounding communities. Beyond prosocial motivation, the intervention is likely to influence several psychological and social dimensions. Increases in empathy, perceived belonging, and social connectedness may emerge as students participate in collaborative and participatory learning environments. Activities centered on character strengths identification are intended to support students in recognizing their personal capacities and applying them in socially meaningful contexts. This process may contribute to strengthening self-efficacy and encouraging students to perceive themselves as active contributors to social well-being. Furthermore, the participatory design process and group-based projects incorporated in the intervention are expected to facilitate a stronger sense of belonging and collective responsibility. Through collaborative ideation, prototyping, and project development, students may experience increased engagement with their peers and develop a deeper appreciation for cooperative problem-solving. These experiences are likely to support both individual psychological development and the

cultivation of a more supportive and prosocial learning environment. From a methodological perspective, the mixed-methods design of the study is intended to provide a comprehensive understanding of the intervention's potential effects. Quantitative findings are expected to offer measurable indications of changes in prosocial motivation and related constructs, while qualitative insights are anticipated to enrich the understanding of students' experiences, perceptions, and reflections throughout the intervention process. Finally, this study seeks to contribute to the literature by presenting a structured educational model that demonstrates how prosocial motivation may be fostered in higher education contexts. By integrating design thinking, participatory design, and positive psychology, the study offers an interdisciplinary framework that bridges design education and psychological well-being research, thereby addressing a notable gap in the existing literature.

6. Limitations

The study focuses on emerging adults aged 18–25, representing the transitional stage between adolescence and adulthood. The design and implementation of products and services will be limited to applications within the campus context. Consequently, the study sample will be restricted to Industrial Design Engineering students at Gazi University, ensuring accessibility for observation and data collection in both experimental and control groups.

7. Ethical Statement

As this article presents a course intervention proposal rather than the implementation itself, formal approval from the university's Ethics Committee was not required at this stage.

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