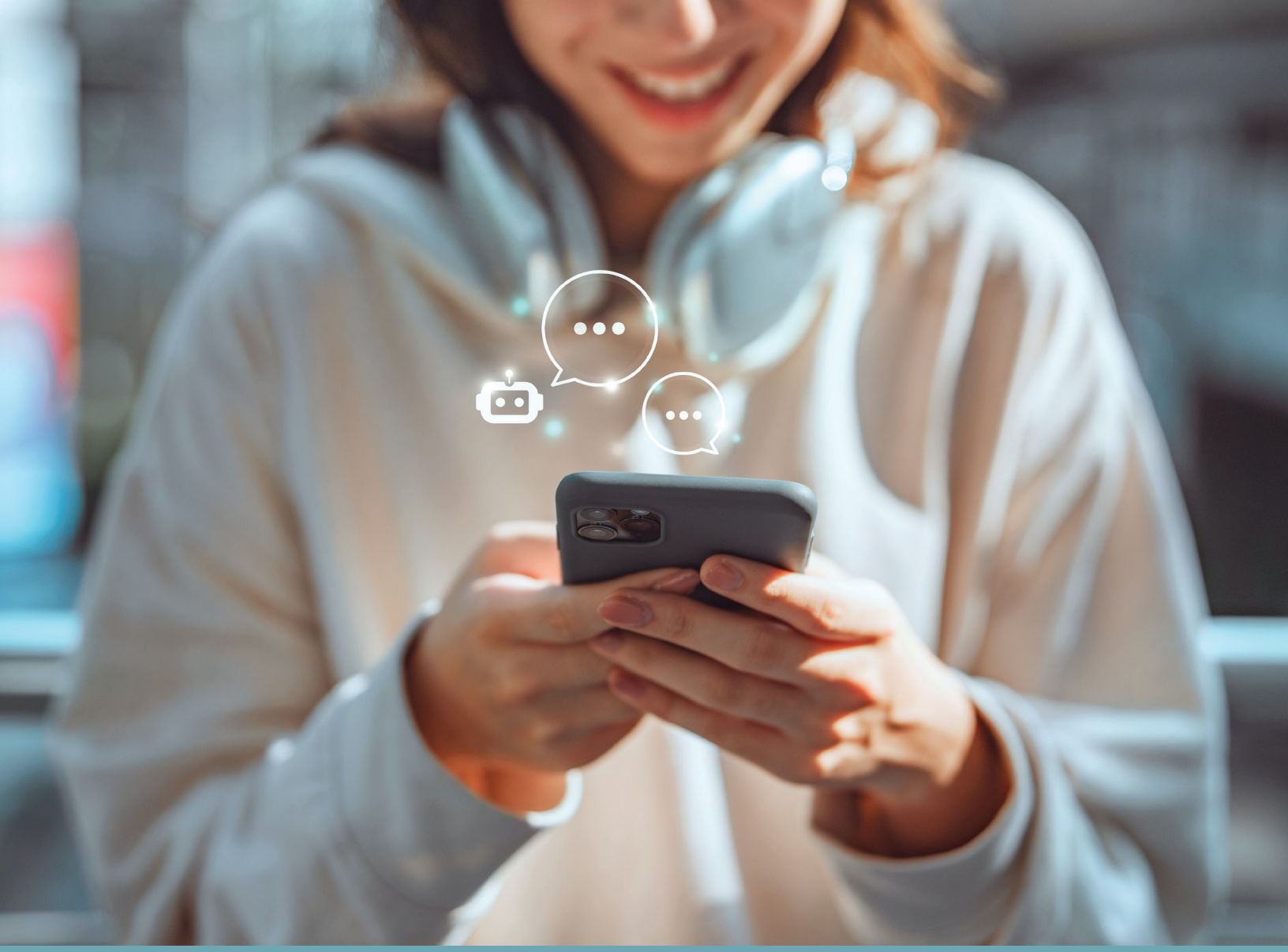

IMPROVING A CHATBOT TO INCREASE FINANCIAL AID APPLICATIONS

Findings from the Optimizing Texting Technology through Engagement Research with Students (OTTERS) Project

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MARCH 2025

mdrc
BUILDING KNOWLEDGE TO IMPROVE SOCIAL POLICY

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OVERVIEW

Since 2019, high school seniors from low-income households in the state of Washington have received guidance from OtterBot, an interactive chatbot texting tool with artificial intelligence (AI) capabilities. The chatbot, designed by the Washington Student Achievement Council (WSAC), provides information to simplify the complex processes involved in applying for financial aid and enrolling in postsecondary education or training. It is specifically intended to support students in the state's College Bound program, which offers early financial aid commitments to students in low-income households, helping make higher education more accessible.

In 2022, the Optimizing Texting Technology through Engagement Research with Students (OTTERS) project—funded by the Capital One Foundation and led by MDRC and WSAC in partnership with Mainstay—was launched to study how the chatbot could be improved to better support students and families. This report provides information about and findings from the first two phases of this ongoing study.

In the study's first phase, the research team identified students' needs and opportunities for OtterBot to better meet those needs by creating process maps, conducting focus groups, administering surveys, and analyzing administrative data. This phase revealed several significant challenges faced by students from low-income backgrounds—particularly those who are the first in their families to pursue higher education. Many students experienced confusion over the financial aid process, uncertainty about college costs, and a lack of awareness and knowledge about financial aid options such as those available through the College Bound program. To compound these difficulties, OtterBot's reach remained limited; only 43 percent of College Bound students received its messages, with just 12 percent responding and 15 percent opting out. This low level of engagement can likely be partially attributed to students' distrust of automated tools such as OtterBot. The research also uncovered differences in engagement, financial aid application completion, and postsecondary enrollment, with gaps evident across GPA, race/ethnicity, and gender.

In the study's second phase, the research team applied these findings to enhance OtterBot's messaging approach to better support student engagement and understanding of financial aid application processes. The alternative messaging approach aimed to use communications best practices to provide clearer information and guidance and to better address behavioral barriers and student concerns about automated tools. Using A/B testing to compare the alternative and standard messaging approaches, the research team found that the alternative messages increased student engagement with OtterBot. There was also a statistically significant increase in financial aid application completion rates for male students. (A statistically significant effect is one that can be attributed with a high degree of confidence to the intervention being studied.)

As a potential next step, Phase 3 of the OTTERS project could pilot and evaluate an intervention that combines the alternative approach to messaging from Phase 2 with a new, more intensive strategy for providing enrollment and financial aid guidance. This strategy could involve using OtterBot to connect students and parents to more in-depth or localized services, or using generative AI to provide more customized messaging.

The OTTERS project has demonstrated the value of using a phased approach, consisting of user research followed by optimization and testing, to improve educational technology platforms. This approach involves studying the intended user, the platform, and possible modifications to the platform to improve the tools and services before devoting time and resources to evaluating the effects of the platform in an impact study. This strategy could prove valuable in analyzing future educational technology initiatives.

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This report would not have been possible without the contributions of many people. First, we would like to thank all of the students and parents who participated in surveys and focus groups; without their insights, this project would have been infinitely less rich. Thank you to the numerous College Bound Champions—educators and advocates—across Washington State who supported our efforts to include student and family feedback in this project. These supporters were fundamental in ensuring the voices of those OtterBot serves were included in the work. We would like to express our sincerest appreciation to the Washington Student Achievement Council (WSAC) for its close partnership in all aspects of this project. This project would not have been possible without the dedication, partnership, and substantial time from WSAC's leadership and staff. We would also like to thank Mainstay, who worked closely with WSAC to implement changes in OtterBot messaging, provide data, and brainstorm, and who were always enthusiastic to contribute in any way that they possibly could.

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The Authors

EXECUTIVE SUMMARY

Washington State provides guaranteed financial aid for postsecondary education or training for all students who meet eligibility criteria, yet the use of this aid remains low. Many students, especially those from low-income backgrounds, struggle with navigating the complex financial aid application processes and understanding available resources.[1] In 2019, to support students in overcoming these challenges, the Washington Student Achievement Council (WSAC) launched OtterBot, an interactive, artificial-intelligence (AI) enabled chatbot.

OtterBot provides students and their parents and guardians with real-time, always accessible guidance about the financial aid and postsecondary enrollment processes. The chatbot provides tips, answers students' questions, and sends reminders about important deadlines. Communication via text message is meant to help demystify financial aid and increase aid take-up by offering timely and relevant support, while also allowing services to be provided at a large scale. While anyone can sign up to receive OtterBot messages, the chatbot is specifically geared toward students in the College Bound program, a financial aid program in Washington State that provides early commitment of financial aid to eligible students from households with low incomes, in order to make furthering their education more financially attainable.[2]

In 2022, the Optimizing Texting Technology through Engagement Research with Students (OTTERS) project, funded by the Capital One Foundation and led by MDRC and WSAC in collaboration with Mainstay, was launched to study how the chatbot could be improved to better support students and families. Thus far, the project has included the following phases:

- **Phase 1: User Research** involved conducting research on individuals in the target population for OtterBot — using a human-centered design approach, including process mapping, focus groups, administrative data analysis, and a survey — to identify opportunities to improve the chatbot.

- **Phase 2: Redesign and Testing** included the redesign of the OtterBot messaging strategy using some of the insights gleaned from the Phase 1 research activities. The changes were primarily focused on textual modifications in keeping with this project's phased approach and the aim to try out lower-cost, easy-to-implement interventions before moving on to larger-scale changes. A/B testing was employed to assess the extent to which this rede-

1. U.S. Department of Education, *First-Generation College Students: Demographic Characteristics and Postsecondary Enrollment* (National Center for Education Statistics, 2021).

2. For eligible College Bound students, College Bound funds can be used to cover tuition for four-year colleges, community or technical colleges, and apprenticeship programs. Families earning low incomes were identified by the students' eligibility for free and reduced-price meals in middle school. Low-income College Bound students make up 98 percent of the total OtterBot user population. Individuals can also message the chatbot directly to opt into messages.

signed messaging strategy led to differences in key outcomes including engagement with OtterBot and financial aid application completion. Phase 2 occurred during the 2023-2024 school year, a year characterized by a delayed and issue-laden rollout of the revamped FAFSA application process.[3]

A potential third phase of the project would pilot and evaluate the effects of using OtterBot to connect individuals to additional, more intensive services suggested by the Phase 1 user research.

The phased approach used in this project — carrying out user research, followed by optimization and testing — can be used in many different settings where there is an interest in optimizing chatbots or other educational technology interventions to improve educational outcomes.

OTTERS PHASE 1: SUMMARY OF FINDINGS

Findings from Phase 1 fell into four categories based on the research goal they addressed. The findings are summarized below.

Research Goal 1

Explore student needs and perceived barriers to applying for financial aid and enrolling in postsecondary education and training

Low-income and first-generation students face many challenges in pursuing higher education, as confirmed by Phase 1. These include uncertainty about costs, confusion over financial aid applications, and lack of knowledge about what various scholarships in Washington State cover. While financial concerns are the biggest issue, other factors such as wanting to stay close to home or uncertainty about how to apply also play a role. Some students may question the value of education, while the effort needed to apply and potential for future debt may feel more certain and daunting. The FAFSA process is notoriously time-consuming and prone to errors, adding mental and time costs. Additionally, postsecondary programs can feel competitive and exclusive, especially for students lacking support networks.

Research Goal 2

Explore student receipt of and engagement with OtterBot messages, levels of financial aid application completion and postsecondary enrollment, and associations among these outcomes

OtterBot messages can only be helpful to students who both receive and read them. One way to assess whether students read the messages is through measuring active engagement

3. Liam Knox, "The Long-Awaited FAFSA Autopsy Is Here," Inside Higher Ed (website: https://www.insidehighered.com/news/government/student-aid-policy/2024/09/24/gao-releases-initial-findings-fafsa-investigation, 2024)

(responding to messages). While OtterBot is designed to help students from families with low incomes, it is not reaching all eligible students; only about 43 percent of College Bound students in the high school graduating classes of 2020 and 2021 were successfully sent an OtterBot message.[4] Among all College Bound students in those cohorts, including those who may not have received OtterBot messages, about 12 percent responded to at least one message during their senior year. Fifteen percent opted out of receiving OtterBot messages at some point during their senior year. Meanwhile, 39 percent completed a financial aid application and 41 percent enrolled in postsecondary education within a year of graduating from high school.

The analysis found differences based on student characteristics. OtterBot was more likely to reach and engage students with higher GPAs who were already more likely to attend postsecondary education or training. Over 79 percent of survey respondents reported that OtterBot messages helped them take at least one of the following actions: complete a financial aid application; apply to a college, training program, or apprenticeship; reach out to a counselor, teacher, or other school staff member; visit a college, training program, or apprenticeship; and/or research a different school or training program. These results do not support the conclusion that OtterBot caused these actions to happen, but they do suggest the survey respondents found the OtterBot messages helpful.

Research Goal 3
Identify differences between subgroups, based on student characteristics

There were large gender differences in financial aid application completion and college enrollment, with males substantially less likely to submit financial aid applications and enroll in education or training after high school. The study also revealed a range of outcomes across different racial and ethnic groups. Importantly, while Hispanic students had rates of financial aid application completion and postsecondary enrollment toward the middle of the distribution, this group makes up almost half of the College Bound student population and could be an important group to focus on for making OtterBot more culturally and linguistically accessible.

Research Goal 4
Assess student reactions to OtterBot messages and opportunities for improving OtterBot

There are several different pathways to making OtterBot more effective in helping students access financial aid and postsecondary education or training. One approach is to provide better, clearer, and more compelling information on financial aid and postsecondary education and training options — for example, by using strategies to overcome behavioral barriers. However, this information is only going to be helpful to students to the extent that they

4. In 2024, legislation was passed that may make it easier for WSAC to access updated contact information, which may increase the reach of OtterBot moving forward.

receive, read and pay attention to messages. Therefore, a second way to potentially make OtterBot messages more effective is to increase the number of students who are reached by and who engage with OtterBot messages. Continuing to invest in efforts to maintain accurate contact information is crucial to improving the reach of OtterBot. Based on the user experience research, key strategies for improving engagement include the following: making sure content of OtterBot messages is helpful to students; developing strategies — including ways to build trust and recognition — to address students' negative perceptions of chatbots and automated messaging; improving awareness of language customization options; adopting the approach that text messaging is not a one-size-fits-all strategy and that for certain advice and activities, students prefer other forms of interaction; providing information about the financial aid process to younger students and parents or guardians; and engaging college counselors to help.

Phase 1 of the OTTERS project resulted in a rich set of findings, highlighting the benefits of conducting formative research before undertaking an impact study. One set of findings highlighted issues the team worked to address in Phase 2 of the OTTERS project, which focused on making strategic revisions to OtterBot's messaging approach.

OTTERS PHASE 2: SUMMARY OF FINDINGS

In the second phase of the OTTERS project, the research team made revisions to OtterBot's existing messaging approach. The team designed and implemented an A/B test to examine the effects of this revised, "alternative" approach compared with the "standard approach." A/B testing is a statistical method, similar to a randomized controlled trial, in which participants in a program are randomly assigned to one of two groups ("Group A" or "Group B") who receive different versions of a program. Group A, the "standard messaging group," consisted of College Bound seniors in the 2023-2024 class who were sent messages that closely mirrored the messages WSAC sent to seniors in the previous year. (The messages included some select modifications from WSAC, MDRC, and Mainstay such as improving the translation practices for Spanish-speaking recipients and changing content to reflect the new FAFSA.) Group B, or the "alternative messaging group," consisted of the remaining seniors, who received a novel set of messages. These messages were designed to address Phase 1 findings on student informational needs and perceived barriers to postsecondary education or training, challenges in OtterBot reach and engagement, and student reactions to and recommendations for improving OtterBot. The goals of the alternative messaging approach were to increase student engagement with OtterBot, to more effectively provide information and guidance to help students navigate FAFSA and postsecondary education applications, and to address other behavioral barriers related to enrollment in postsecondary education or training that were identified in Phase 1.

The analysis found that the alternative messaging approach increased student engagement with OtterBot. Additionally, while the alternative approach did not increase financial aid application completion for female students or nonbinary students, it led to a statistically significant increase in financial aid application completion rates among male students. Among

College Bound male students, 49 percent of those who received the alternative messages completed a financial aid application compared with only 46 percent of those who received the standard messages. Based on these data, it can be estimated that if all male students in the study had received the alternative messages, an additional 141 students would have successfully completed financial aid applications, a milestone with the potential to change the trajectories of their lives. It is important to note that the data collection period overlapped with the rollout of the revamped 2024-2025 FAFSA application process, with which users experienced a number of technical problems. So, these results may not reflect what would have happened in a more typical school year.

Analysis of the effects by subgroup found that the alternative messaging strategy increased response rates across all subgroups. The alternative messaging strategy also led to reductions in opt-outs among students with GPAs below 2.0 and among students in rural areas, suggesting that the alternative messages were better able to keep these students engaged.

It should also be noted that Phase 2 tested one version of OtterBot messaging against another version of OtterBot messaging; therefore, the results show the effect of the change in messaging rather than the overall effectiveness of OtterBot.

CONCLUSION

While the changes made to OtterBot's messaging approach had positive effects on engagement and financial aid application completion for male students, changes in messaging language alone cannot fully address some of the critical issues highlighted in Phase 1. However, with more substantive changes to OtterBot, the chatbot could be a crucial tool in connecting students and parents or guardians to more intensive services that can support them in financial aid application and postsecondary enrollment. A possible Phase 3 pilot study could focus on improvements such as using a highly engaging OtterBot to connect students to regional and local supports and information, more fully integrating OtterBot with guidance counselor activities, connecting students to services meant to support basic needs, connecting students to peer mentors, or using generative AI to provide more customized and tailored educational support.

A number of states, organizations, and schools are using chatbots to increase access to postsecondary education and training and even for other educational purposes. The process, tools, and methodologies from this project are applicable in many different settings where there is an interest in optimizing these types of interventions. An upcoming toolkit will present several tools from the project that could be adapted and reused by others. Additionally, the OTTERS project has demonstrated the use of a phased approach, consisting of user research followed by optimization and testing, to research educational technology platforms. This approach involves studying the intended user, the platform, and possible modifications to the platform to improve the tools and services before devoting time and resources to evaluating the effects of the platform in an impact study. This strategy could prove valuable in analyzing future educational technology initiatives.

1

Introduction

The state of Washington provides guaranteed financial aid for all in-state students who complete a valid financial aid application and meet program requirements, including having a qualifying family income level and attending an approved postsecondary institution in the state.[1] However, Washington consistently has a low rate of Free Application for Federal Student Aid (FAFSA) completion by high school seniors, compared with other states.[2] In 2017, students in Washington failed to claim more than $50 million in available federal student financial aid.[3] In response to this situation, in 2019, the Washington Student Achievement Council (WSAC) launched OtterBot, an interactive chatbot with artificial intelligence (AI) capabilities, to help students from families with low incomes take advantage of available financial resources and enroll in postsecondary education or training.[4]

OtterBot is geared towards students in the College Bound program, a financial aid program initiated in 2007 by WSAC. College Bound is designed to encourage students from families earning low incomes to pursue postsecondary education or training by providing an early commitment of financial aid — during students' middle school years — to make furthering their education and training more financially attainable.[5] The College Bound program commits to cover the cost of any tuition and fees that are not covered by the Washington College Grant or institutional scholarships. While any student can sign up for OtterBot, it is specifically targeted at students from lower-income families who may have less access to good informa-

1. Washington Student Achievement Council (2024)b. Students are required to complete a financial aid application—either the Free Application for Federal Student Aid (FAFSA) or the Washington Application for State Financial Aid (WASFA)—and be income eligible for financial aid when enrolling. Income eligibility is defined as a family income at or below 65 percent of median family income.
2. FAFSA Tracker—National (2024).
3. Washington Student Achievement Council (2019).
4. College Bound funds can be used to cover tuition for four-year colleges, community or technical colleges, and apprenticeship programs.
5. Families earning low incomes were identified by the students' eligibility for free or reduced-price meals in middle school. Low-income College Bound students make up 98 percent of the total OtterBot user population. Individuals can also message the chatbot directly to opt into messages.

tion on postsecondary education from their friends and family.[6] In this way, OtterBot provides a means of addressing equity gaps stemming from differences in socioeconomic status.[7]

College Bound students and their parents receive periodic text messages containing timely information about financial aid and enrollment resources, requirements, and deadlines.[8] In addition, users can ask the bot questions at any time. When OtterBot receives a question, the bot delivers an AI-generated reply based off information in a human-created knowledge base of content that is regularly updated by WSAC staff. If the bot receives a question it cannot answer, it passes the question on to a WSAC financial aid expert.

In 2022, the Optimizing Texting Technology through Engagement Research with Students (OTTERS) project, funded by the Capital One Foundation and led by MDRC and WSAC in partnership with Mainstay, was launched to study how the chatbot could be improved to better support students and families. Thus far, the project has included the following phases:

- **Phase 1: User Research** involved conducting research on individuals in the target population for OtterBot — using a human-centered design approach, including process mapping, focus groups, administrative data analysis, and a survey — to identify opportunities to improve the chatbot.

- **Phase 2: Redesign and Testing** included the redesign of the OtterBot messaging strategy using some of the insights gleaned from the Phase 1 research activities. The changes were primarily focused on textual changes in keeping with this project's phased approach and the aim to try out lower-cost, easy-to-implement interventions before moving on to larger-scale changes. A/B testing was employed to assess the extent to which this redesigned messaging strategy led to differences in key outcomes including engagement with OtterBot and financial aid application completion. As will be discussed later, Phase 2 occurred during the 2023-2024 school year, a year characterized by a delayed and issue-laden rollout of the revamped FAFSA application process.[9]

A potential third phase of the project would pilot and evaluate the effects of using OtterBot to connect individuals to additional, more intensive services suggested by the Phase 1 user research.

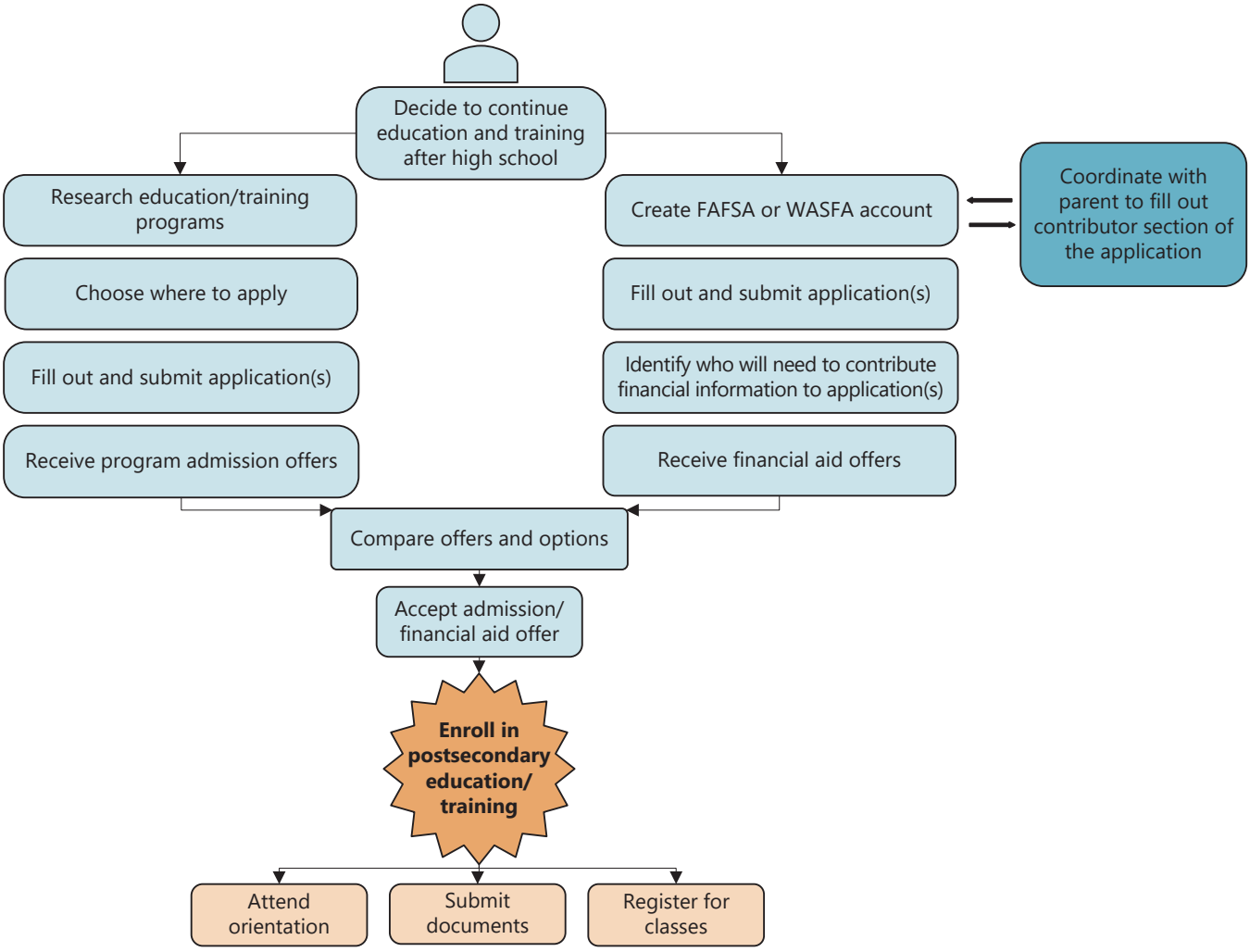
This project's phased approach — consisting of user research followed by optimization and testing — can be used in many different settings where there is an interest in optimizing chatbots or other technology-based interventions to improve educational outcomes.

6. Irlbeck et al. (2014).
7. Kim and Nuñez (2013).
8. For brevity, this report will generally use "parents" to refer to "parents and guardians."
9. Knox (2024).

AN OVERVIEW OF CHALLENGES OF THE FINANCIAL AID APPLICATION AND ENROLLMENT PROCESSES

Figure 1.1 depicts the decisions and steps involved in completing and submitting admissions and financial aid applications, which are both required to ultimately enroll in a college or training program and receive financial aid. As the figure shows, navigating the complex financial aid and postsecondary enrollment processes demands significant effort from students and their parents and requires a number of important decisions. Students must simultaneously apply for financial aid and admissions to an eligible education or training program. This creates a challenging scenario: Students may be reluctant to start financial aid applications without knowing their educational plans, and vice versa. Parents must also be involved in the process and face their own challenges in completing necessary steps. Adding to the

Figure 1.1. The Financial Aid Application and Postsecondary Enrollment Process



confusion, with the new FAFSA process implemented in the 2023-2024 school year, parent requirements have changed; parents now need to create their own account to provide their information regarding a dependent student's FAFSA.

While this report focuses on Washington State, the process and barriers are very similar in other states and the findings are therefore relevant to other states as well.

ABOUT THE COLLEGE BOUND PROGRAM

Washington State's College Bound program provides eligible seventh, eighth, and ninth graders with an early commitment of state financial aid for postsecondary education or training. The goal of College Bound is not only to provide funding, but also to boost the number of students who eventually take advantage of financial aid funding for postsecondary education by making younger students and their families aware of available opportunities. The amount of the award is based on average college tuition at public college rates, some fees, and a small book allowance and can be used at over 65 colleges, universities, and technical schools in Washington.[10]

For students to enroll, their families must meet income requirements, and students must meet other program requirements in high school.[11] While the program initially required students to sign up in order to participate, the state legislature updated regulations in 2021 so that seventh, eight, and ninth graders eligible for free or reduced-price meals are automatically enrolled.[12]

Before they can receive the funds, students enrolled in College Bound must do the following:

- Complete a financial aid application — either the FAFSA or the Washington Application for State Financial Aid (WASFA) — and be income eligible;[13]

10. The specific amount labeled "College Bound" on the financial aid package will look different at each college and for each student. A student's College Bound amount is determined after the WA Grant and other state aid or scholarships have been awarded. If a student's need (award amount) is met by these other sources, the student may receive a reduced or no College Bound award. See Washington Student Achievement Council (2024b).
11. Students must meet certain eligibility requirements when first enrolling in College Bound and later when accessing College Bound funds. Various requirements include: (1) Attend public school and be eligible for free or reduced-price meals in seventh, eighth, or newly eligible in ninth grade (auto-enrollment); (2) Be in state foster care or a dependent of the state between seventh grade and high school graduation (auto-enrollment); (3) Have a family income at or below 65 percent of median family income; (4) Have Washington State residency (homeschool students); (5) Attend a private school or homeschool program in Washington State and meet the income requirements; (6) Be in another type of foster care and not eligible for free or reduced-price meals. See Washington Student Achievement Council (2024a).
12. Washington State Legislature (2021).
13. The WASFA is an option for students who may not have documentation of citizenship status and therefore are not eligible for federal financial aid. Students who complete a WASFA are applying only for state aid. See Washington Student Achievement Council (2024c); In order to access College Bound

- Graduate from a Washington high school or homeschool program;[14]
- Have no felonies on record; and
- Enroll in a postsecondary program within one year of graduating high school.

In addition, students planning on enrolling directly in a four-year institution must have at least a 2.0 cumulative GPA.

ABOUT OTTERBOT

OtterBot is primarily aimed at Washington high school students enrolled in College Bound. Many colleges, organizations, and states aiming to expand access to postsecondary education and training are increasingly turning to virtual advising platforms such as text-message-based chatbots to improve outcomes such as rates of financial aid application completion and enrollment.[15]

OtterBot is intended to help students through the processes of applying for financial aid and postsecondary education or training by providing real-time guidance that is always available. Through targeted messaging, OtterBot provides tips to simplify the financial aid application process, answers students' questions, and sends reminders about key deadlines. Its use of texting, a familiar medium for students and many of their families, is meant to help demystify financial aid and application processes and to increase participation by offering information and immediate responses. By automating responses, OtterBot also addresses the issue of scale — ensuring that students from low-income households across the state receive consistent, relevant, and timely information — with the goal of ultimately guiding more students toward securing financial aid and enrolling in postsecondary education or training.

OtterBot sends out two basic types of messages: "nudges" and interactive outreach campaigns. Nudges are one-way messages that share information and reminders. Nudges do not encourage students to engage with the message — that is, no response is requested — though students still have the option to reply to the messages or ask follow-up questions. In contrast, interactive campaigns request responses and engagement using questions with open-ended or close-ended response options, and the bot follows up according to the student's response.[16] If OtterBot receives a question, the bot delivers an AI-generated reply based off

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funds, a family's income must be at or below 65 percent of median family income for their household size.

14. Starting with academic year 2023-2024, students with a GPA below 2.0 can go to a two-year school and receive College Bound funds to cover this. Washington Student Achievement Council (2024)b.
15. DeBaun (2023); Kim, Meyer, and Choe (2022).
16. For responses to close-ended questions, there are programmed replies for each response option. For responses to open-ended questions, the bot delivers an AI-generated reply based off information in

information in a human-created knowledge base of content that is regularly updated by WSAC staff. If the bot receives a question it cannot answer, it passes the question on to a WSAC financial aid expert for responses.

When OtterBot was launched, messages were sent only to high school seniors. In later years, OtterBot began messaging juniors and parents as well, though the focus of this report is on messages to seniors. In Phase 1, enrolled seniors received approximately 96 text outreach campaigns between the August before their senior year and the August after graduation from high school. Topics included learning about OtterBot, standardized testing, guidance and support for the college selection process, applying to college, transitioning into college, and general motivation and support.

Initially, before 2021, students were placed on the OtterBot contact list if they were financially eligible for College Bound when they were in seventh or eighth grade, signed the College Bound pledge and enrolled in the program, and had updated contact information on file.[17] As of 2021, students no longer sign up for the College Bound program, but instead are automatically enrolled and then placed on the OtterBot contact list. Contact information must be provided by either a student's school or students themselves in order for students and their parents to receive OtterBot messages. College Bound students do not begin receiving text messages from OtterBot until they are in high school and are notified that WSAC will communicate with them.

ABOUT THIS REPORT

This report describes activities conducted during the first two phases of the OTTERS project and the insights gained from this work. It then closes with some overall conclusions and suggestions for future work, including a possible Phase 3 of the project. As noted above, the complexity of the processes of applying for financial aid and for postsecondary education and training depicted in Figure 1.1, and the need to carry out both processes simultaneously, are not unique to Washington State. Therefore, the processes used in this study and the findings presented in this report are broadly applicable to state agencies, policymakers, practitioners, and others serving students during this important transition period.

the human-created knowledge base of content.

17. The College Bound Pledge is a commitment to meeting the College Bound requirements, which means students must: (1) Have no felony convictions on record; (2) Apply for financial aid by completing the FAFSA or WASFA application; and (3) Attend a participating institution within one year of graduating from high school.

2

OTTERS Project Phase 1: User Research

The first phase of the OTTERS project used quantitative and qualitative data collection and analysis to achieve the following research goals:

1. Explore student needs and perceived barriers to applying for financial aid and enrolling in postsecondary education and training;

2. Explore student receipt of and engagement with OtterBot messages, levels of financial aid application completion and postsecondary enrollment, and associations among these outcomes;

3. Identify differences among subgroups, based on student characteristics; and

4. Assess student reactions to OtterBot messages and opportunities for improving OtterBot.

USER RESEARCH ACTIVITIES

To achieve these goals, the team engaged in a series of activities through which they formulated research questions and developed and implemented plans to study those questions using a mixed-methods approach. Table 2.1 briefly summarizes the activities undertaken, and what the researchers hoped to learn from each. A more detailed description of these activities follows.

Step 1: College Bound Process Mapping and Behavioral Diagnosis

First, the MDRC and WSAC team articulated the steps College Bound students take from the first step of enrollment into College Bound through receiving the College Bound funds. Then, the team narrowed their focus on College Bound students in their senior year of high school and mapped out more detailed steps seniors need to take to apply for and receive financial aid and enroll in postsecondary education or training in Washington. The team used this process map to take the student perspective and develop hypotheses of **behavioral**

Table 2.1. OTTERS Project Phase 1 Research Activities

ACTIVITY	ACTIVITY PARTICIPANTS	GOAL
Step 1 College Bound process mapping and behavioral diagnosis	MDRC and WSAC staff in research and policy roles, and student access and support roles	Apply student-centered approach to outline the steps College Bound students need to take to apply for and receive financial aid and enroll in postsecondary education or training
Step 2 Quantitative analysis of administrative data	Students enrolled in the College Bound program and in the 2020 and 2021 expected graduation cohorts	Assess (1) OtterBot's reach among College Bound students; (2) College Bound students' engagement with OtterBot; (3) financial aid application completion and postsecondary enrollment rates
Step 3 Student and parent focus groups	12 focus groups of high school juniors and seniors likely eligible for College Bound in the 2022-2023 school year; 2 focus groups of parents of students likely to be eligible for College Bound	Assess student familiarity with chatbots and interest in receiving info via chatbots; gather feedback on sample messaging strategies
Step 4 Student survey	662 high school seniors in the 2022-2023 school year who were enrolled in the College Bound program and were age 18 or older as of May 1, 2023	Collect data on goals after high school, barriers to further education/training, financial aid and College Bound knowledge, chatbot experiences, and gaps in information that could have supported students' decisions

bottlenecks, or process factors that might impact student completion of required steps.[1] The team considered how structural, place-based factors — such as local industries, proximity to colleges, and proportion of college-educated adults in one's education district — might interact with individual action and decision barriers to influence student experiences in the financial aid and college application process. See the forthcoming OTTERS Toolkit publication, which will provide key tools used during Phases 1 and 2 of the OTTERS project to help study and optimize OtterBot, for some of the process maps created for this project.

Step 2: Quantitative Analysis of Administrative Data

The project team analyzed administrative data including student demographic information, OtterBot engagement data, financial aid data, and postsecondary enrollment data. All student-level administrative data used in Phase 1 were drawn from the 2020 and 2021 graduation

1. An overview of the behavioral diagnosis and design process can be found in Richburg-Hayes, Anzelone, Dechausay, and Landers (2017).

cohorts of students in the College Bound program. Their characteristics are shown in Table 2.2. Through this analysis the team sought to better understand (1) students' receipt of and engagement with OtterBot messages; (2) how OtterBot engagement is related to important outcomes; and (3) how receipt of messages, engagement, and outcomes vary among demographic subgroups.

Table 2.2. Demographic Characteristics of College Bound Students

Characteristic	Mean (%)
Gender	
Female	49.7
Male	49.7
Nonbinary	0.4
Race/ethnicity	
American Indian or Alaskan Native	1.7
Asian	5.7
Black or African American	5.9
Hispanic or Latino	44.6
Native Hawaiian or Pacific Islander	1.5
White	34.0
Two or more races	6.1
GPA	
Below 2.0	23.8
2.0 to 3.0	43.4
Above 3.0	32.8
Population Density	
Rural	26.4
Urban/suburban	73.6
Sample size[a]	64,041

SOURCE: MDRC calculations based on administrative data provided by WSAC.

NOTES: Sample includes College Bound students in the 2020 and 2021 graduating cohorts.

[a]The total sample sizes for the following subgroups differ from the sample size given in this row: GPA (61,743) and Population Density (59,865).

One facet of the analysis involved the use of descriptive statistics to learn about the characteristics of the students in the College Bound program, including demographic and academic information and their rates of OtterBot response (referred to as engagement), OtterBot opt-outs, financial aid application completion, and postsecondary enrollment. The team also used a combination of logistic regression plus variable importance analysis — both

methods of statistical analysis — to identify the extent to which student characteristics were associated with important outcomes.

Step 3: Student and Parent Focus Groups

To complement the quantitative analysis, the project team facilitated focus groups with (1) juniors and seniors from the classes of 2022 and 2023 who were likely to be eligible for the College Bound program, and (2) parents of students who were likely to be eligible, along with other adults such as grandparents of students and staff members of nonprofits that serve high school students in the district.[2] The focus group research aimed to gauge participants' familiarity with chatbots and their interest in receiving information about postsecondary education and training and financial aid from a chatbot. Focus group participants also provided reactions to prototypes of six text messaging campaigns developed by the research team to address behavioral bottlenecks identified in the process mapping stage.

The project team conducted 13 student focus groups across eight school districts, along with 2 parent focus groups and 1 parent interview across two different school districts. An effort was made to talk to students and parents in regions that represent the diverse economic and social conditions of students in both eastern and western Washington.[3] Both caregiver focus groups were conducted in Spanish. In total, the team spoke to approximately 108 juniors and seniors potentially eligible for College Bound and 33 parents.

Step 4: Student Survey

MDRC and WSAC deployed a survey to students in the College Bound program to obtain additional information on topics that surfaced in the other activities in Phase 1, including postsecondary school aspirations, perceived barriers to postsecondary education and training, knowledge about the FAFSA and the College Bound funding opportunity, experience with OtterBot and other messaging bots, and information gaps that may have affected students' planning decisions. The survey was sent to seniors enrolled in College Bound who were age 18 or older as of May 1, 2023, and for whom contact information was available. This included approximately 16,000 seniors in the 2022-2023 academic year.[4] Overall, 662 students re-

2. Most adults in focus groups were parents. For brevity, this report will use the term "parent focus groups" to refer to groups including parents, guardians, and nonprofit staff members.

3. The set of school districts was selected to cover a representative set of economic and social conditions across the state (both eastern and western Washington, with a variety of urban, rural, and suburban regions with different economic conditions and infrastructure). WSAC staff identified 38 schools within the four districts with whom they had existing relationships and could feasibly enlist support for focus group participation. Among those schools with overall student enrollments above 200, WSAC then selected the top three schools in each district based on the percentage of students from families with low incomes. Prior to finalizing this rank ordering, WSAC confirmed that the schools identified for recruitment approximately aligned with the demographics of the corresponding district and varied in their college-going rates and OtterBot engagement levels. Finally, WSAC collaborated with staff at schools to coordinate focus groups with high school students and some parents.

4. The total number of surveys sent is not adjusted to account for nonreceipt resulting from outdated

sponded to at least one question in the survey, with 550 students completing the survey. Among survey respondents, 67 percent (366 respondents) reported that they had received a message from OtterBot.

Respondents to the survey were not representative of all students in the College Bound program; most reported that they had submitted their financial aid application and planned to enroll in some form of postsecondary education in the fall following graduation from high school.[5]

FINDINGS AND POTENTIAL IMPROVEMENTS

Findings from Phase 1 are organized below according to the four main research goals of Phase 1.

Research Goal 1

Explore student needs and perceived barriers to applying for financial aid and enrolling in postsecondary education and training

The Phase 1 research activities highlighted multiple barriers along a student's journey toward financial aid application completion and postsecondary enrollment. The research team found that many students — especially those from communities with limited access to financial, academic, cultural, and social capital — lack access to the information they need to decide if they should continue their education. When they find the information, it may be communicated in a way that is complex and difficult to understand. Especially for students whose parents did not complete a four-year college degree in the United States (such as first-generation students), the number of unknowns in this investment equation can be overwhelming and stall progress needed to make that investment.[6] In addition, **hassle factors** — or seemingly minor inconveniences that can have an outsized impact on persistence — embedded in the process can contribute to students or parents failing to complete the required applications. Finally, students may receive subtle or overt cues that they are not "college material."

These barriers are discussed in more detail below using evidence from the process mapping, focus groups, and survey. The discussion includes references to Figure 2.1, which presents considerations in making postsecondary decisions and percentages of survey respondents who described each consideration as "somewhat" or "very much" affecting their decisions.

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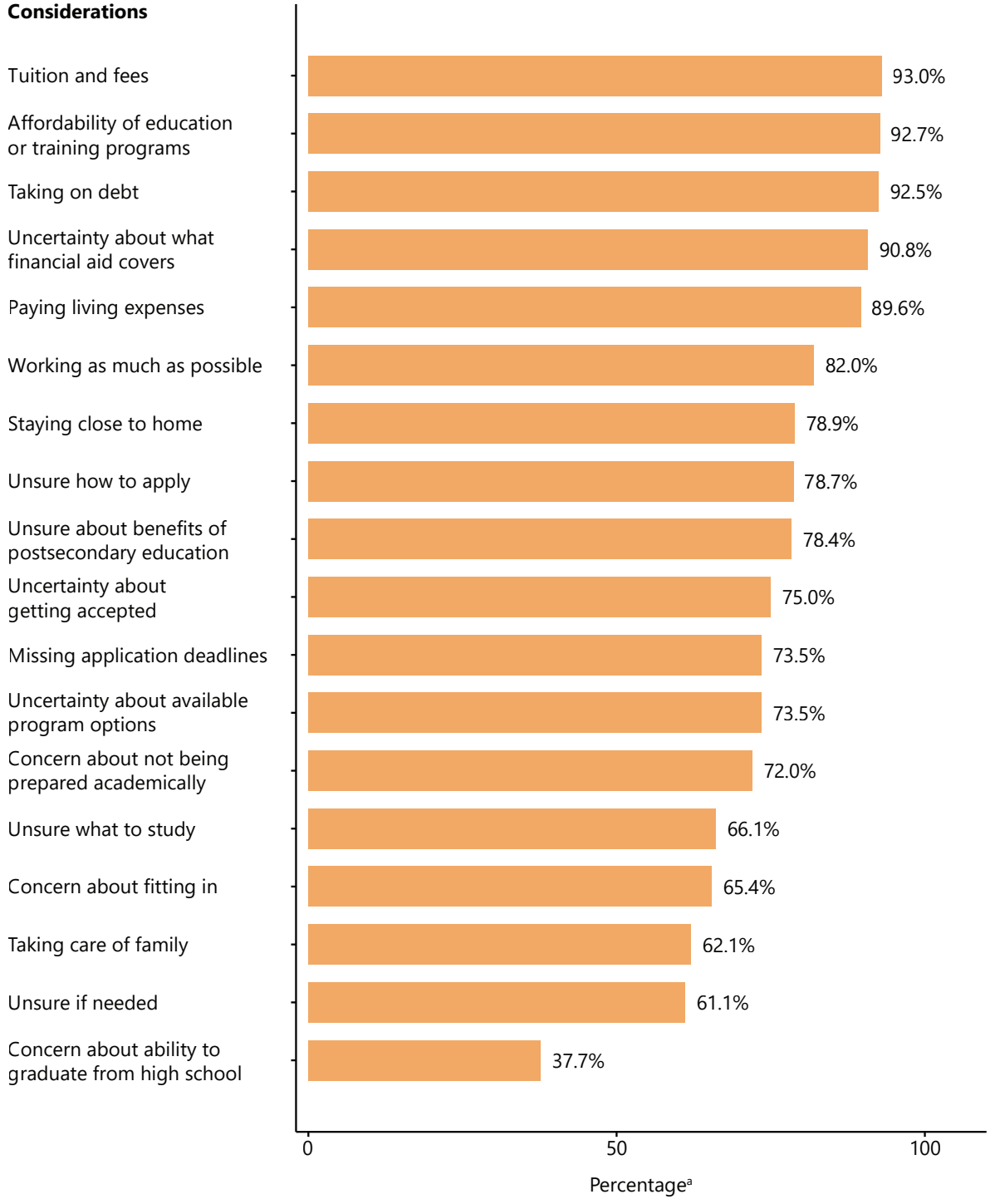
and/or incorrect contact information.

5. Compared with nonrespondents, respondents may have been more likely to have valid and up-to-date contact information, had higher engagement with OtterBot and the College Bound program, and had higher rates of financial aid application and postsecondary enrollment (based on self-reported data from the survey).

6. U.S. Department of Education (2021).

Figure 2.1. Considerations That Influenced Students' Postsecondary Decisions



(continued)

Figure 2.1 (continued)

SOURCE: MDRC calculations based on OTTERS survey data.

NOTES: The full survey received 662 responses from eligible participants (respondent was age 18 or older, submitted only one response, and answered at least one question). The analysis presented above includes 591 eligible responses.

[a]Percentage of respondents who reported that this was somewhat or very much a consideration when making postsecondary decisions.

Concerns About Tuition and Fees

As shown in Figure 2.1, 93 percent of survey respondents indicated that the ability to afford tuition and fees was either somewhat or very much a factor that affected their post-high school plans. Similarly, many students had concerns about taking on debt and their ability to pay for living expenses such as transportation, housing, and food.

Lack of Awareness About Available Funds. Although students who participated in the survey and a focus group were likely to be eligible to receive the maximum benefits through the College Bound program — including grant aid to cover the average college tuition at public colleges, some fees, and a small book allowance — few fully understood the details of the program's benefits and eligibility requirements. Approximately 87 percent of survey respondents had heard of the College Bound funding opportunity, but, of those, nearly 44 percent were unaware that the program covers tuition at the average public college rate and nearly 48 percent were unaware that it also covers certain fees.[7] Another quarter of respondents said that they were unsure of what the funding covered.

Survey respondents were also asked to think back to their experience making postsecondary decisions and to reflect on how useful additional information across various subjects would have been. About 84 percent of respondents said that receiving information on scholarships or other forms of financial aid would have been extremely helpful or very helpful, and about 71 percent said that information on career options and their requirements would have been extremely helpful or very helpful.

Lack of Timely Information About Financial Aid Packages. Part of the complexity of enrolling in a postsecondary education or training program is that students will not know the real costs of continuing their education until they receive a financial aid award letter, and they cannot receive a financial aid award letter until *after* they have taken all the steps to apply for financial aid and postsecondary education or training. Several focus group respondents expressed a desire for more personalized information about scholarships and students' personal eligibility for aid. Understandably, participants wanted clear information on whether they were eligible, how much aid they would receive, and how much they would end up having

7. Although students were prompted to select all that apply, 60 percent of respondents selected only one option. It is possible that some respondents were unaware that they could select multiple uses, and this could be leading to artificially low percentages.

to pay toward college, before going through the entire application process. However, given the complexity of financial aid systems, designing a service to collect the necessary data and communicate this personalized information to students would be very difficult. See Box 2.1 for students' reactions to a sample message that aimed to address this student need by providing the maximum financial aid amount a College Bound student could receive.

BOX 2.1

Focus Group Reactions to Sample Messages with Financial Aid Amounts

Several study participants expressed an interest in receiving concrete and personalized information about how much aid they would receive. While it would be very difficult for OtterBot to provide this information, the research team responded by developing a sample OtterBot message campaign indicating the *maximum* amount of aid available to College Bound students ($48,820). Interestingly, this campaign received mixed responses. Some focus groups thought the specific number was helpful. In other focus groups there was a strong distrust of the specific number, and disbelief that students would actually receive that amount. Similarly, students described the "tuition-free college" phrasing used in this campaign as "spammy."

A potential explanation for these mixed responses is that students and their families view Washington State's generous financial aid allowance as too good to be true. A central argument in the performance trust literature is that the performance of public service delivery shapes citizen trust in government.* Students who live in areas or attend schools with fewer or inequitably distributed resources, or who belong to a racial or ethnic group whose interests have not consistently been served by public institutions, may reasonably have less trust in public goods and services. Building trust in OtterBot as a credible messenger, particularly with students who may be wary of government support, was an important focus of messaging changes made in Phase 2 of the OTTERS project.

NOTE: *Hansen, Frederik Godt. 2021. "How Impressions of Public Employees' Warmth and Competence Influence Trust in Government." *International Public Management Journal* 25, 6: 939–961.

Altogether, these findings highlight that students could benefit from more accessible and personalized information on state-based financial aid opportunities such as the College Bound program, a key rationale for OtterBot.

Personal Trade-Offs

For many students, choosing to go to college means working less, earning less, and being away from family. After the cost of college, these personal responsibilities were the most

common considerations reported by survey respondents. As Figure 2.1, shows, 79 percent of participants reported that a desire to stay close to home was somewhat or very much a consideration; 82 percent reported that wanting to work as much as possible was somewhat or very much a consideration.

Uncertainty About the Benefits

Approximately 78 percent of survey respondents indicated that uncertainty about the benefits of continuing their education and training was somewhat or very much a consideration when making their post-high school plans, as shown in Figure 2.1. The team's process mapping and behavioral diagnosis activities suggest a potential explanation for this. Pursuing postsecondary education and training programs does pay off in the long run for most students.[8] However, **present bias** — the tendency to give more weight to present concerns than future ones — may lead some students to make decisions based on the immediate costs of postsecondary education or training rather than the potential future benefits. In the short term, students must invest time and effort to enroll in postsecondary education or training programs. They often need to take on debt to pay for their costs of living and may not be available to work and earn income. Meanwhile, the potential benefits of education — the prospect of a better job and earning capacity — are uncertain, less salient, and in the future. In Phase 2, some OtterBot messages were crafted to make the future benefits more salient by providing resources for students to explore the common career pathways and average salaries in Washington State.[9]

The uncertainty described above may be an even larger consideration for students who are not pursuing bachelor's degrees. The process analysis in Phase 1 found that many of the informational resources about postsecondary options — including messages sent through OtterBot — are geared more toward an audience pursuing a bachelor's degree as opposed to those hoping to enter community college or workforce training and certificate programs. These resources may thus generate misconceptions about who should consider postsecondary education. Relatedly, students in focus groups expressed wanting information about workforce education and options other than the traditional college pathway. Receiving information that better aligns with what they believe their prospects are could help students feel more academically prepared and confident in taking steps in the long process required to continue their education.

8. Individuals with higher education earn more money and are more likely to be employed and to enjoy nonpecuniary benefits in health, family, and civic life. See Ma, Pender, and Welch (2016); Returns on the investment in college depend on a variety of factors, such as field of study and type of degree acquired. See Kim and Tamborini (2019).
9. Through this process, WSAC identified that one unique value proposition of OtterBot is that it can curate and deliver reliable, Washington-specific informational resources. This approach to crafting messages can help address common information gaps students face in the college and financial aid application process. For example, at the website https://careerbridge.wa.gov, Washington Career Bridge provides clear and salient information on the returns students can expect to receive from investing in higher education, with common careers and average salaries by county.

Uncertainty About Path of Study

Mapping out the substeps involved in completing college and financial aid applications highlights the large number of important, long-term decisions students are required to make. Deciding what to study and choosing which schools or programs to apply to can be daunting. Questions about students' aspirations asked in program applications can often feel overwhelming, and this may lead students to avoid, procrastinate on, and eventually give up on taking some of the actions necessary to enroll in postsecondary education or training. During focus group discussions about barriers to applying for financial aid, one student described the difficulty of selecting an area of study, which is commonly requested on program applications: "When you're not sure about what you want to study in college… like they give you a list and you have to choose one. And sometimes you're not sure about it. Like what do you want to do in college? That's definitely a thing."

As shown in Figure 2.1, a large proportion of survey respondents reported that their postsecondary decisions were somewhat or very much affected by uncertainty about what to study (66 percent) or uncertainty about program options (74 percent). In focus groups, students expressed a desire to learn about specific programs that align with their interests, and which institutions offer those programs. Two of the messaging prototypes displayed during focus groups and viewed favorably by students provided localized lists of postsecondary programs and career information relevant to local industries. Students appreciated that the message was interactive and gave them an active choice in information they received. Given the positive feedback on this messaging strategy, it was used in Phase 2 messaging. This could be a finding to build on in the future given the ability of generative AI to tailor content.

Complexity of Financial Aid Applications

The FAFSA application process is often experienced by users as being time consuming, difficult to understand, and susceptible to user error.[10] Phase 1 of this study involved students in the 2020 and 2021 graduation cohorts; these cohorts completed the FAFSA process before the application was redesigned in 2023. Before the redesign, the application had over 100 questions and required students and parents to report extensive information on their finances in a single application. While the redesigned FAFSA application implemented in the 2023-2024 school year was designed to make the process easier for families, users experienced a number of technical issues and delays, leading to an array of other problems as described in Box 2.2.[11] Updates to the FAFSA mean most people no longer need to manually enter financial information, because it is automatically transferred from federal taxes. However, to enable the automatic transfer of financial information, students and each of their contributors need to create a Federal Student Aid ID and wait for the system to confirm their identity before they can log in to complete their portion of the application and consent to the transfer of their federal tax information. The process mapping in Phase 1 found that

10. Bettinger et al. (2009); Davidson (2015); Scott-Clayton (2017).

11. The FAFSA application that students filled out in the 2023-2024 school year was the 2024-2025 FAFSA form.

BOX 2.2

2024-2025 Revised FAFSA Application Process

The recent 2024-2025 Free Application for Federal Student Aid (FAFSA) rollout, which impacted the class of 2024, has faced significant issues due to a major overhaul of the system. The redesign aimed to simplify the application process by reducing the number of questions and required tax information, following the FAFSA Simplification Act passed in 2020.* However, users encountered a number of technical problems, which have been attributed to moving forward with the rollout while most of the underlying processing systems were unfinished.† These problems, which disproportionately affected families with dual or mixed citizenship statuses (including a proportion of College Bound students), delayed the processing of applications and introduced errors into some students' information.† Subsequent corrections to FAFSA submissions had to be processed one at a time, further adding to delays. This sequence of events led to concerns that students may have missed out on receiving the financial aid they needed in time to meet tuition deadlines, potentially reducing college enrollment rates.*

NOTES: *Isaac Windes, "Ongoing FAFSA Glitches Leave Thousands of San Antonio Students Behind," San Antonio Report (website: https://sanantonioreport.org/ongoing-fafsa-glitches-leave-thousands-of-san-antonio-students-behind, 2024).

†Liam Knox, "The Long-Awaited FAFSA Autopsy Is Here," Inside Higher Ed (website: https://www.insidehighered.com/news/government/student-aid-policy/2024/09/24/gao-releases-initial-findings-fafsa-investigation, 2004).

these hassle factors in completing the FAFSA can add up to significant mental and time costs for students and parents.

Importantly, students cannot complete financial aid applications alone; they need the support and engagement of parents. Some students shared that parent distrust or resistance when students ask for financial information is a barrier to completing financial aid; one student suggested that guidance on how to talk to a parent about financial aid applications would be beneficial. Nearly 80 percent of students who responded to the survey indicated that it would have been somewhat, very, or extremely helpful to have received additional information on completing financial aid applications. Parents who participated in focus groups expressed wanting a better understanding of the fundamentals of the college and financial aid application process before senior year so that students and parents would be familiar with the process before it is time to act. These findings align well with recent OtterBot initiatives that have expanded messaging to ninth through eleventh graders and their parents.

Concerns About Academic Readiness and Belonging

As shown in Figure 2.1, 75 percent of survey respondents indicated that their likelihood of being accepted into a postsecondary program was somewhat or very much a consideration

in their postsecondary decisions, and 72 percent reported similar concerns about academic preparedness. However, many of Washington State's colleges and technical schools at which students could use the College Bound funds did not have a minimum GPA requirement as of the 2023-2024 academic year.

Several students in focus groups talked about the challenges of being a first-generation college student. Students enrolled in College Bound may be the first ones in their families or social circles to pursue postsecondary education or training. Among students in the 2020 and 2021 graduating cohorts, only 21 percent had a parent with an associate's degree or higher. This suggests that, compared with their peers, students in the College Bound program may have fewer role models who pursued postsecondary education and training. As a result, they may struggle with negative self-perceptions about their ability to succeed or experience fears of not belonging. In the focus group discussions, the research team presented students with prototype messages that were tailored to respond to hypothesized barriers students might be facing. One message prototype aimed to address the fear of not belonging in college using a **social testimony**—a text from a hypothetical peer who expressed concerns about fitting in before realizing everyone else felt the same way. This prototype was the least popular in the focus groups, often eliciting negative reactions, which suggests that text messaging may not be well suited to address concerns of belonging or fitting in.

The findings discussed so far suggest that students in the College Bound program are facing several trade-offs and considerations as they are making their postsecondary plans, including some concerns that may require more substantial assistance than a texting platform alone can provide. This idea will be revisited below when the report discusses a possible Phase 3 of the OTTERS project.

Need for Information and Support to Navigate the Process

To learn how students seek support for and information about postsecondary planning, the survey asked whom students turn to when they have questions. Over 62 percent of respondents indicated that they go to their parents for information, which highlights the importance of text outreach to parents. The focus groups provided additional insights, with students reporting relying on older siblings and parents for information and advice to various degrees. At the same time, some students shared that their parents do not always have the information to support them, and sometimes students need to explain the postsecondary enrollment and financial aid process to their parents.

As mentioned previously, parents who participated in focus groups expressed wanting a better understanding of the fundamentals of the postsecondary enrollment process and more resources to navigate it. Information could be provided to parents through in-person presentations and handouts in addition to OtterBot. Students in focus groups recommended that OtterBot provide reminders to parents about financial aid timelines and program admission timelines so that parents can encourage and support their student in meeting deadlines.

In addition to turning to parents, survey respondents reported relying on school counselors for help planning their next steps after graduation. Because of this, and because college counselors are instrumental in obtaining accurate contact information for students, WSAC

has been making a strong effort to reach out to counselors to inform them about OtterBot and find ways to encourage collaboration.

Research Goal 2

Explore student receipt of and engagement with OtterBot messages, levels of financial aid application completion and postsecondary enrollment, and associations among these outcomes

While the previous section described the various obstacles students face in reaching the milestones of financial aid application completion and postsecondary enrollment, this section presents findings on the extent to which students contacted by Otterbot are achieving these milestones. It begins with the theory of change behind OtterBot and then presents data on OtterBot's reach, on students' degree of engagement with the chatbot, and on students' success rates in reaching milestones. It explores the extent to which two measures of engagement with OtterBot — response and opt-out — are associated with financial aid application completion and postsecondary enrollment. Lastly, it describes some of the actions students took after receiving OtterBot messages. The findings in this section come from an analysis of administrative data.

Theory of Change: How OtterBot Messages Move the Needle on Financial Aid Application Completion and Postsecondary Education and Training Enrollment

As Figure 2.2 shows, the theoretical pathway linking OtterBot to the student outcomes of financial aid application completion and enrollment in postsecondary education or training depends on the realization of several intermediate steps. The theory of change begins when a College Bound senior enrolled in OtterBot messaging with accurate contact information first receives an OtterBot message.[12] The message must capture the student's attention so that the student is motivated to read it. This point in the process presents a valuable opportunity to use behavioral science approaches to optimize the message's content and formatting to interest the target population. The message must also be received without technical glitches that interfere with reading.

Next, the student must understand the content of the message. To support this step, the message should be clearly written in a language that is familiar to the student and not exceed the student's reading level. A student who reads and understands a text message then has several options, and the available data provide information on three of these routes: The student may (1) respond to the message with a question or answer, (2) opt out of receiving any further messages from OtterBot, or (3) take no observable action.[13] Theoretically, students who either respond to the message or take no action (and remain "opted-in") may be inspired to act

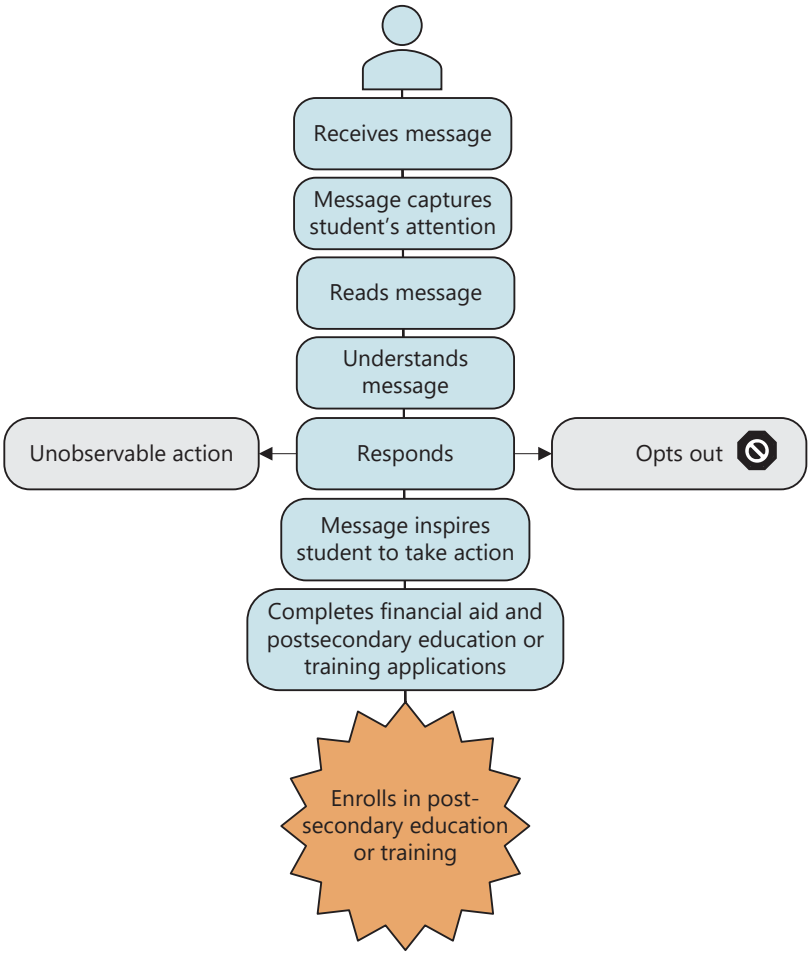
12. Technically, there is no way to measure whether a student actually receives OtterBot messages. The data indicate only whether a message was successfully sent (did not generate an error message or bounce back); The Phase 1 cohorts of students started receiving OtterBot messages in their senior year. Shortly after that, WSAC expanded OtterBot messaging to juniors. Beginning in the spring of 2024, WSAC expanded OtterBot messaging to ninth and tenth graders.

13. The available data provide information on responding and opting out.

based on the message.[14] Potential actions could include clicking on a link; reaching out to school personnel, parents, or friends with questions about post-high school options; or doing research on postsecondary education programs online, among others.[15]

The theory of change posits that some students who have completed this sequence of steps — from receiving a message to taking action based on the message — will be more likely to achieve the final outcomes of applying for financial aid and enrolling in postsecondary education or training.

Figure 2.2. OtterBot Theory of Change



OtterBot's Reach

During Phase 1, OtterBot was not reaching all students whom it was designed to help. As shown in Table 2.3, only about 43 percent of students enrolled in the College Bound program in the high school graduating classes of 2020 and 2021 received an OtterBot message.[16] This means that over half of students enrolled in College Bound (57 percent) were never reached by OtterBot. One issue that affected reach in the Phase 1 results was that before the class of 2024, students had to sign a pledge to be enrolled in the College Bound program and receive OtterBot messages, rather than being automatically enrolled. Since not all eligible students signed the pledge, this limited the potential reach of OtterBot. Another challenge was maintaining up-to-date contact information for students.

Since OtterBot's launch in 2019, WSAC has put considerable effort into promoting OtterBot and expanding its reach. For example, enrollment into the College Bound program is now automated based on student eligibility criteria such as receiving free or reduced-price

14. Technically, a student who opts out may have also been helped or inspired by OtterBot.
15. Students who opt out can in principle pursue these activities as well.
16. Although the data do not currently include information on whether a student reads a message sent by Otterbot, they do provide information on whether a message was successfully sent without resulting in an error or bounce-back message.

Table 2.3. Outcomes for College Bound Students in 2020 and 2021 Cohorts, Overall and by Subgroups of Interest

Subgroup	Received Any OtterBot Message (%)	Responded to an OtterBot Message (%)	Opted out of OtterBot Messages (%)	Completed Financial Aid Application (%)	Enrolled in Postsecondary Education or Training (%)	Sample Size (n)
Overall	42.8	12.4	15.2	39.3	40.6	64,041
Gender						
Female	44.4	13.2	15.7	46.7	48.0	31,812
Male	41.4	11.7	14.8	32.2	33.4	31,806
Nonbinary	49.6	14.6	16.1	20.5	24.0	254
Race/Ethnicity						
American Indian/ Alaskan Native	39.4	9.4	17.5	29.0	27.7	1,079
Asian	45.8	16.4	11.2	66.6	71.8	3,628
Black/African American	44.1	13.7	14.4	46.8	50.7	3,808
Hispanic/Latino	43.1	13.0	13.9	40.2	39.2	28,556
Native Hawaiian/ Pacific Islander	47.2	12.8	17.4	30.4	27.0	978
White	41.7	11.0	17.4	33.8	37.2	21,752
Two or more races	44.2	12.4	16.5	39.4	39.9	3,883
GPA						
GPA less than 2.0	40.5	8.0	16.6	7.4	11.4	14,691
GPA 2.0 to 3.0	44.3	12.5	16.0	37.7	35.2	26,777
GPA greater than 3.0	44.9	16.5	13.7	68.7	70.0	20,275
Population Density						
Rural	41.0	10.6	16.0	38.0	38.2	15,792
Urban/suburban	44.8	13.6	15.2	41.7	42.3	44,073

SOURCE: MDRC calculations using data from WSAC.

NOTES: Sample includes 64,041 students enrolled in the College Bound program in the 2020 and 2021 graduating cohorts. "Received any messages" refers to instances where at least one OtterBot message was successfully sent to the student (no bounce-back or error message was received in response). "Responded to message" indicates that a student sent at least one message to OtterBot and did not opt out of OtterBot messages at any point. "Financial aid application" includes both FAFSA and WASFA. "Enrolled in postsecondary education" includes two- and four-year colleges and technical schools, training programs, and apprenticeships.

meals or being in the foster care system. However, provision of correct contact information depends on school district, student, and/or parent action. It requires that the information was accurate at the onset (typically in seventh or eighth grade) and remains accurate through a student's senior year, or is updated when needed. School districts, students, or parents can share updated contact information by proactively reaching out to the program or responding to outreach efforts.

Recipients of OtterBot messages can reply and request that OtterBot update the contact information on record. In fact, in the Phase 1 analysis, the highest engagement rate to a campaign occurred in response to "Wrong Number — Campaign Start," with over a quarter (26 percent) of recipients responding. This suggests that maintaining accurate records of student mobile phone numbers is a significant issue, as mobile phone numbers may change. Plus, parent information may be given in place of a student's. One focus group participant, a student, knew about OtterBot but reported that OtterBot messages went to a parent's phone.

The process of maintaining updated contact information presents a potential equity issue. Students with less access to financial resources may be more likely to experience housing instability or have their contact information, such as cell phone numbers, change, since they may have to switch carriers or go through periods during which service is suspended. Financially strained households are also more likely to use prepaid mobile phones, which do not always allow customers to keep the same number when switching devices.[17] Students who are already strongly considering postsecondary education or training or who have greater social and financial support may also be more likely to reach out to the program to update their contact information.

Washington State Senate Bill 6053, which mandates data-sharing agreements between WSAC and the Office of Superintendent of Public Instruction, may lead to an increase in the proportion of College Bound students who have accurate contact information in OtterBot's database, starting in 2025. Even with the implementation of this bill, it will be important to monitor whether the percentage of students reached by OtterBot changes over time and by cohort and to understand if these changes have led to improvements in equity. First, WSAC will need to learn about the quality of the contact information, and this monitoring will provide an avenue for doing so. Second, the college outreach team is pausing its existing manual updating process in the hopes that this new source of data will make the manual process unnecessary. Alongside this monitoring, WSAC can continue to develop targeted communications about OtterBot for trusted messengers, since Phase 1 findings make clear that students and families are more likely to use the chatbot when they hear about it from someone they trust.

Engagement with OtterBot

Given the data available, the team chose to examine students' engagement with OtterBot through measuring the rate of response to messages and opt-out rates.[18] Measuring engage-

17. Bruce (2021); Citizens Utility Board (2020).

18. Students might send a message to OtterBot to answer a question posed by the bot, to indicate they would like additional information on a given topic being discussed, or to seek information

ment can be a helpful tool for understanding the extent to which messages are capturing students' attention and providing meaningful content, although it is not necessary for students to respond to a message to benefit from it. Unfortunately, data on another potentially helpful measure — the number of text messages read — were not available for the OtterBot platform.

Among all students enrolled in the College Bound program in the 2020 and 2021 cohorts, including those who may not have received OtterBot messages, about 12 percent responded to at least one message during their senior year (Table 2.3). Fifteen percent of OtterBot message recipients opted out of receiving OtterBot messages at some point during their senior year.[19]

Rates of Achievement of Postsecondary Milestones

Through analysis of administrative data, the research team also examined the rates at which students enrolled in College Bound attained the milestones of financial aid application completion and postsecondary enrollment.[20] As shown in Table 2.3, among students in the 2020 and 2021 graduating cohorts, 39 percent completed a financial aid application and 41 percent enrolled in postsecondary education or training within a year of graduating from high school. It is in the interest of increasing these rates that WSAC continues to study how to improve OtterBot's effectiveness.

Association Between OtterBot Engagement and Postsecondary Milestones

The research team also investigated the extent to which OtterBot engagement, compared with other variables, was associated with the achievement of postsecondary milestones, when controlling for several other predictors. This analysis provides a deeper understanding of how OtterBot engagement is connected to financial aid application completion and postsecondary enrollment, potentially revealing areas where targeted interventions could improve outcomes.

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on a different topic from OtterBot. While these measures are helpful for learning about student engagement with OtterBot, they have limitations. For example, if a student opts out, then this could signal annoyance, frustration, or confusion. It could also be a sign that the student already has the information needed to complete a financial aid application and enroll in postsecondary education and does not need the messages. Similarly, a student who responds could be engaging constructively, or they could be expressing confusion, frustration, or annoyance, depending on the nature of the response. Even if a student responds to a message prompt in accordance with the messaging text (for example, a text asks for a numeric response, and the student provides one), this does not necessarily mean the student has fully understood the message or even read it completely.

19. Note that unlike in Phase 2, the measure of opting out used for the Phase 1 analyses does not exclude cases in which a parent opts out because their contact information was listed instead of the student's.

20. As mentioned earlier, the College Bound program promotes a wide range of postsecondary education and training options, including public community or technical colleges, public four-year institutions, approved independent colleges or universities, and private career colleges or universities. Therefore, this study includes this full set of postsecondary options in the measure of postsecondary education and training enrollment; The data on postsecondary education and training includes records from the WSAC Interim Report in which all institutions receiving state aid are required to report. These data primarily identify instances in which students are enrolled in a two- or four-year institution. The data do include records for some other types of institutions, but some apprenticeship records are tracked separately as part of the WA College Grant Apprenticeship aid program.

Figures 2.3 and 2.4 present two plots showing the results of this analysis. The plots illustrate the association between a set of binary variables and two outcomes — financial aid application completion and postsecondary enrollment — controlling for all other variables listed. This relationship is quantified as the percentage point change in completion and enrollment rates associated with a change in the status of each variable. As shown in the figures, students who responded to one or more OtterBot messages experienced a 15 percentage point increase in their financial aid application completion rates compared with students who did not respond, after accounting for other factors, and a 10 percentage point increase in their postsecondary enrollment rates. On the other hand, opting out of OtterBot did not have any statistically significant associations with either outcome. Importantly, compared with response, GPA and participation in dual enrollment programs (Running Start, College in the High School, and CTE Dual Credit) had stronger positive associations with financial aid application completion and enrollment in postsecondary education or training. While this analysis shows a link between responding to OtterBot and important outcomes, it does not prove a causal relationship. Instead, it suggests that response is a factor worth examining further in Phase 2.

Actions Students Report Taking After Receiving OtterBot Messages

Among survey respondents who reported that they were familiar with OtterBot, over 79 percent said that the OtterBot messages helped them take at least one of the following actions: complete a financial aid application; apply to a college, training program or apprenticeship; reach out to a counselor, teacher, or other school staff member; visit a college, training program, or apprenticeship; and/or research a different school or training program. While survey respondents were not representative of all students in the College Bound program, as previously discussed, their responses do suggest that they found the OtterBot messages to be useful. Importantly, these results should not be interpreted as evidence that OtterBot *caused* students to complete these actions; a different study design would be necessary to test that.

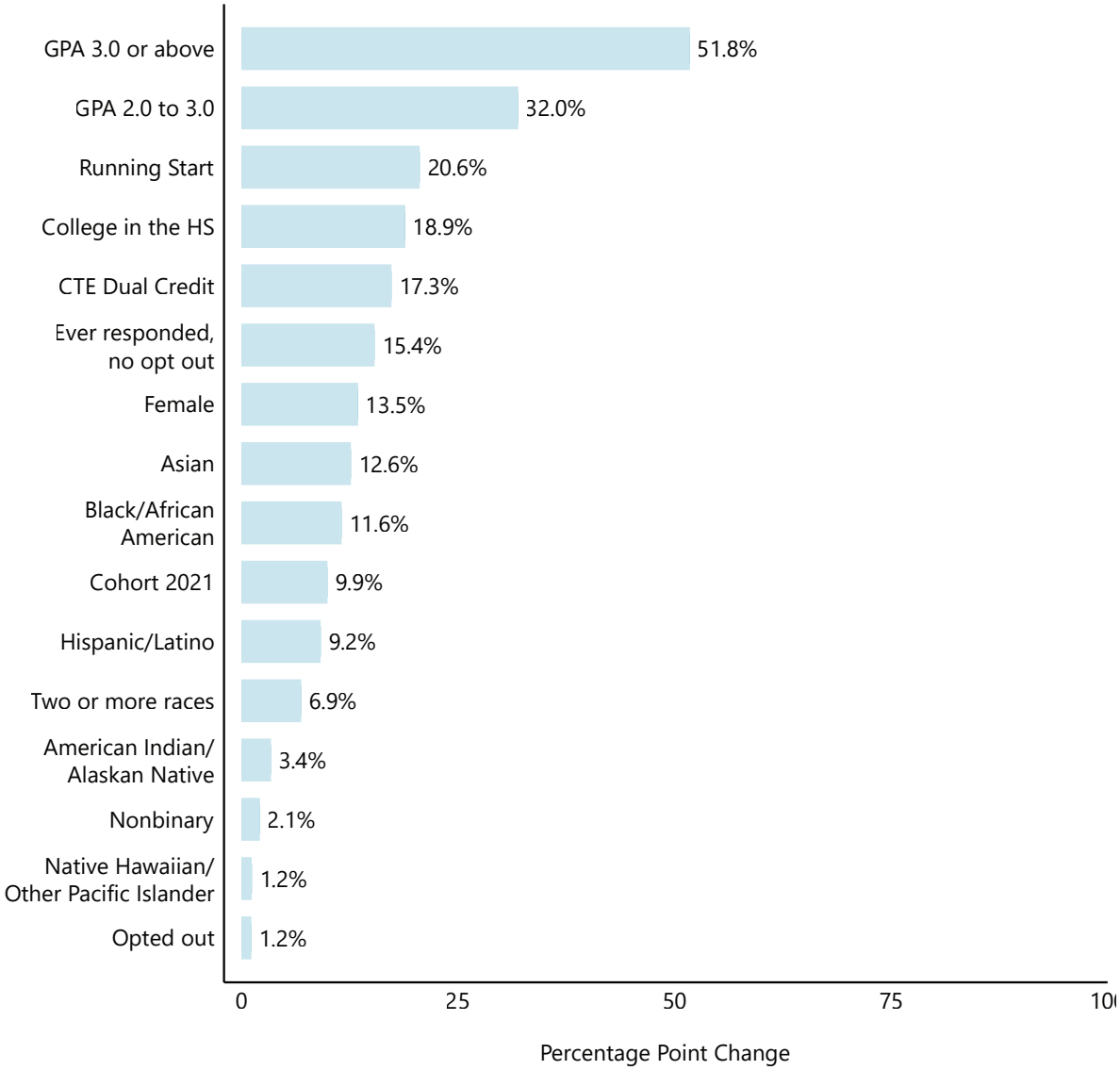
Research Goal 3
Identify differences among subgroups, based on student characteristics

The research team also assessed whether any student demographic characteristics were associated with measures of engagement with OtterBot or achievement of milestones. These outcomes were examined by subgroups defined by gender, race/ethnicity, GPA, and population density. Gender and race/ethnicity are important subgroups to examine because previous research has shown that there are often educational differences among these subgroups.[21] GPA, one measure of academic achievement that evidence suggests is associated with family socioeconomic status, is another important subgroup to study given the College Bound program's goal of serving a broad range of students from low-income backgrounds.[22] Finally, population density is of interest because Washington's rural communities may have different

21. Bahr, Sparks, and Hoyer (2018).

22. Reber and Smith (2023).

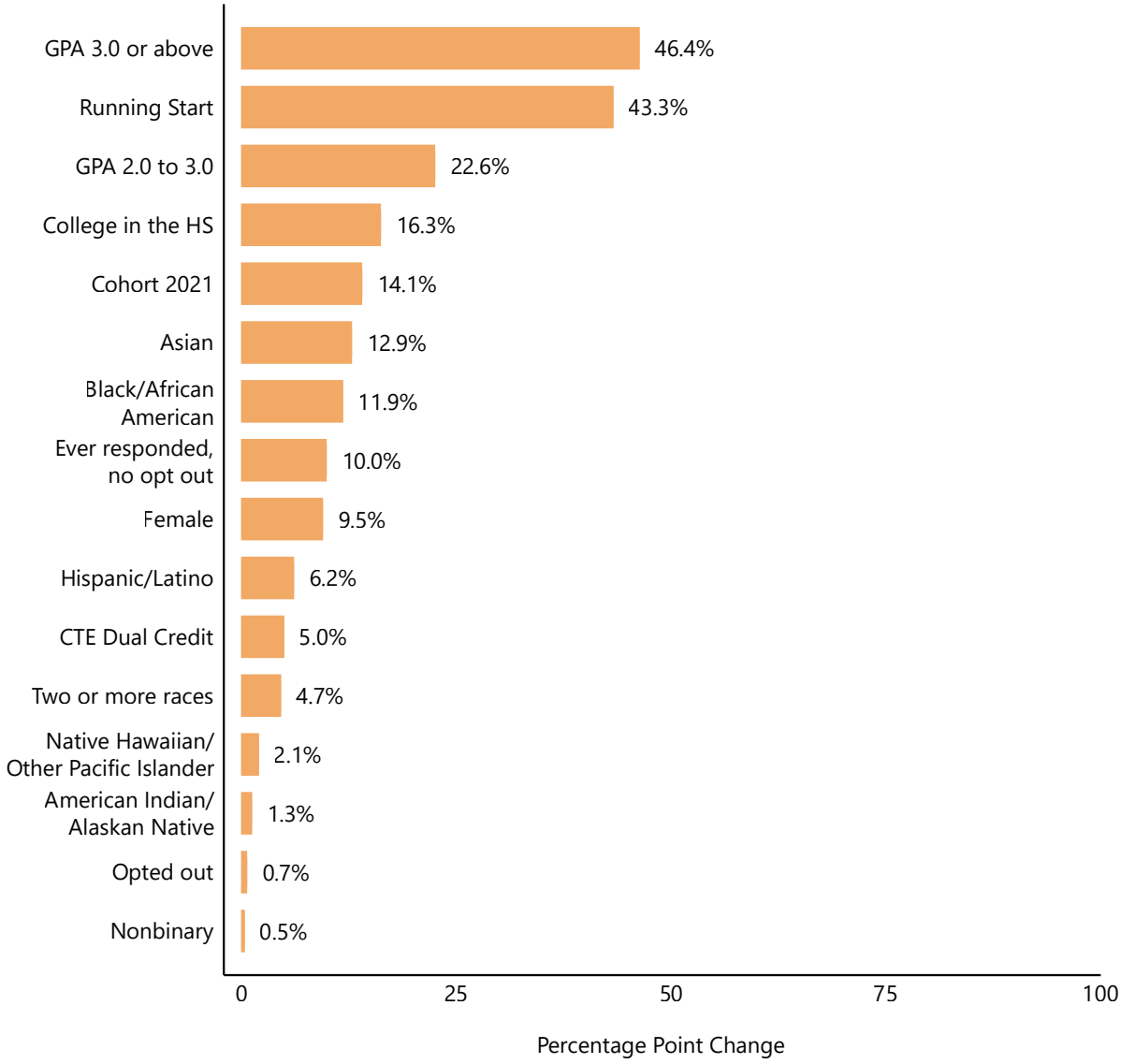
Figure 2.3. Association of Engagement with Financial Aid Application Completion



SOURCE: MDRC calculations based on WSAC administrative data.

NOTES: Percentage point change in completion rates associated with a change in the status of each variable. Reference categories are as follows: White (for Asian, Black/African American, Hispanic/Latino, Two or more races, American Indian/Alaskan Native, Native Hawaiian/Other Pacific Islander), Male (for Female, Nonbinary), GPA below 2.0 (for GPA 2.0–3.0, GPA 3.0 or above), Cohort 2020 and students who never opted out (for Cohort 2021 Ever responded, no opt out and Opted out), and students not participating in any academic programs (for Running Start, College in HS, CTE Dual Credit). Sample includes 26,921 College Bound students in the 2020 and 2021 graduating cohorts who were sent at least one OtterBot message that did not receive a bounce-back or error message. "Financial aid application" includes both FAFSA and WASFA. "Postsecondary enrollment" includes two- and four-year colleges and technical schools, training programs, and apprenticeships.

Figure 2.4. Association of Engagement with Postsecondary Enrollment



SOURCE: MDRC calculations based on WSAC administrative data.

NOTES: Percentage point change in postsecondary enrollment rates associated with a change in the status of each variable. Reference categories are as follows: White (for Asian, Black/African American, Hispanic/Latino, Two or more races, American Indian/Alaskan Native, Native Hawaiian/Other Pacific Islander), Male (for Female, Nonbinary), GPA below 2.0 (for GPA 2.0–3.0, GPA 3.0 or above), Cohort 2020 and students who never opted out (for Cohort 2021 Ever responded, no opt out and Opted out), and students not participating in any academic programs (for Running Start, College in HS, CTE Dual Credit). Sample includes 26,921 College Bound students in the 2020 and 2021 graduating cohorts who were sent at least one OtterBot message that did not receive a bounce-back or error message. "Financial aid application" includes both FAFSA and WASFA. "Postsecondary enrollment" includes two- and four-year colleges and technical schools, training programs, and apprenticeships.

needs and face different challenges compared with urban and suburban locations.[23] The findings are shown in Table 2.3 and discussed below.

Gender. The analyses revealed gender differences in outcomes that OtterBot could potentially help address. Following national trends, male students had lower rates of financial aid application and postsecondary enrollment rates compared with female students. For example, financial aid application completion rates and postsecondary enrollment rates were both about 15 percentage points lower among male students compared with female students. Nonbinary students had rates of financial aid application completion and postsecondary enrollment that were substantially lower than those of their peers, even though their OtterBot reach and response rates were slightly higher.[24] OtterBot messaging that better caters to nonbinary students and male students might help address the gap. For males in particular, research has suggested that career and technical education and apprenticeship programs could be a promising avenue for addressing some of the gender differences.[25] One strategy to test in the future could involve sending male students more information about these educational options.

Race/Ethnicity. Asian students and Black students — each of whom account for approximately 6 percent of the overall population of students in the College Bound program — had the highest financial aid application completion rates and postsecondary enrollment rates, while rates were lowest for American Indian/Alaskan Native and Native Hawaiian/Pacific Islander students.[26] Importantly, while Hispanic students had rates of financial aid application completion and postsecondary enrollment toward the middle of the distribution, this group makes up almost half of the student population in College Bound and could be an important group to focus on for making OtterBot more accessible and equitable.

GPA. The data show that a higher GPA corresponds with higher rates of response and completion of the postsecondary milestones. The methodology employed in Phase 1 does not allow the team to determine how much, if any, of that association is due to OtterBot causing improved outcomes for this group. As a high GPA is already known to correlate strongly with college-going, this finding may suggest that the College Bound students who are already most likely to enroll in postsecondary education are also most likely to respond to OtterBot.[27] To the extent that OtterBot is helping students, it follows that OtterBot might expand its impact by (1) focusing on outreach to students with lower to middling GPAs, who may feel less academically prepared for postsecondary education or training, and (2) targeting these

23. Irlbeck et al. (2014).
24. Nonbinary students accounted for only about 0.4 percent of the sample, so their rates should be interpreted with caution.
25. Doyle et al. (2023).
26. These patterns are consistent with overall financial aid application completion rates for Washinton State. See Washington Student Achievement Council (2024d). American Indian/Alaskan Native and Native Hawaiian/Pacific Islander students each make up about 1.5 percent of the College Bound student population.
27. Allensworth and Clark (2020).

students with information about college alternatives such as apprenticeship and training programs that have less strict GPA requirements.

Population density. The team compared outcomes for students attending high schools in rural areas with those of students attending schools in more densely populated urban and suburban areas. As Table 2.3 shows, rates of reach, response, financial aid application completion, and post-secondary enrollment were slightly higher among students attending high schools in urban or suburban areas.

Together, these subgroup findings suggest that there is some degree of variation in key OtterBot outcomes based on College Bound-enrolled student characteristics such as gender, race/ethnicity, GPA, and population density. These findings also helped identify subgroups to consider when designing the messaging for Phase 2.

Research Goal 4
Assess student reactions to OtterBot messages and opportunities for improving OtterBot

There are several different pathways to making OtterBot more effective in helping students access financial aid and postsecondary education or training. One set of strategies is to provide better, clearer, and more compelling information on financial aid and postsecondary education and training options (for example, using strategies to overcome behavioral barriers). However, this information is only going to be helpful to students to the extent that they receive, read, and pay attention to messages. Therefore, a second way to make OtterBot messages more effective is to increase the number of students who are reached by and engage with OtterBot messages. As described above, there is significant room to reach and engage more students. A third set of strategies would use OtterBot to connect students and families to more intensive services to serve deeper needs and address bigger challenges for families than can be addressed through texting alone. This pathway is one that the research team is hoping to pursue as part of a third phase of the OTTERS project.

This section of the report focuses on the first two pathways described above — namely, strategies to provide better, clearer, and more compelling information, and strategies to increase reach and engagement with OtterBot. Some of these changes were implemented in Phase 2 (see Chapter 3).

Invest in Efforts to Maintain Accurate Contact Information

Maintaining up-to-date contact information relies on coordination and manual updates by school staff. WSAC's expanded efforts to involve guidance counselors and the new data-sharing agreement included in Washington State Senate Bill 6053 are promising avenues for reaching this goal. However, even with these improvements, making it easier for message recipients to fix mistakes (such as messages sent to the parent rather than the student) is a valuable strategy in improving the accuracy of contact information.

Make Sure Content of OtterBot Messages Is Helpful to Students

Among survey respondents, about 33 percent of individuals who reported receiving a message from OtterBot found the chatbot to be extremely or very helpful, 41 percent found the chatbot to be somewhat helpful, and 27 percent found the chatbot to be not at all or a little helpful. This finding suggests that there is potential to enhance OtterBot's usefulness by modifying how information is conveyed — by using simpler language, for instance — since, according to the survey, the kind of information that OtterBot delivers addresses topics that students want to know more about.

To work toward developing text messages that students would find more useful, the research team used focus group sessions to collect feedback on messaging prototypes designed to address behavioral barriers identified during Phase 1. Students and parents in focus groups were shown prototypes of six message campaigns employing various messaging strategies and specific content the research team wanted initial feedback on before further development and wide-scale implementation.

Of the campaigns tested, students appeared to find those with **message matching**, or messages designed to match students' **context** (for example, their geographic location), useful.[28] The most commonly reported "favorite" prototype had links to begin the FAFSA and an associated **reminder**; students said they liked having a clear, practical, and actionable next step. Students also indicated that they would want to talk to a real person (usually someone they know) about their personal circumstances, rather than a bot that can only provide general information. Overall, focus group responses suggest that chatbots can be particularly useful in providing information that is specific to an individual student's academic and career interests, reminders about deadlines, and calls to action. This result supports exploration of using generative AI to help produce tailored content as part of a Phase 3 pilot. There is also a continued need for individualized supports provided outside of the chatbot to address students' questions and concerns related to their particular financial and household situations, another idea being considered as part of a potential Phase 3 pilot.

To make sure that information is as useful as possible to students, it is important that it is timely. Message content creators should meet regularly to make sure that students are receiving the information and reminders that they need at any given time. In addition, WSAC should continue efforts to improve OtterBot's ability to answer questions and/or direct people to good sources of information.

Develop Strategies to Address Students' Perceptions of and Level of Trust in Chatbots and Automated Messaging

Students already have experience interacting with chatbots other than OtterBot, and their interactions and perceptions of OtterBot are affected by these previous experiences. In focus groups, students mentioned previous experiences with bots, including the FAFSA bot. Some

28. Message matching refers to a strategy of distributing persuasive messages that have features (for example, emphasis on certain themes) that align with characteristics of the target audience. See Joyal-Desmarais et al. (2022).

reports were positive, but students commonly reported that when they have asked for help specific to their own situation, bots tended to lead to a dead end or general answers. The following techniques can be used to address student perceptions of and trust in OtterBot.

Make the chatbot as easy to use as possible. When a bot fails to properly interpret the question it receives or does not have information to answer the question, it may reply with a generic message, which can diminish trust or interest in engaging with the bot. To minimize these mistakes and improve trust in the chatbot, it is important that users find it relatively easy to access the information they want using the bot.[29] With OtterBot, students can proactively solicit information on a topic either by using the #command function, which cues up information in the database tagged with that command (for example, #fafsa, #essaywriting, #scholarships), or by replying to a message with a closed-ended response option (for example, an inquiry about the types of colleges a student wants to receive information about). A good messaging strategy should make it as easy as possible for students to access additional information on topics of interest.

Reduce message fatigue. Many students in focus groups report receiving large numbers of automated messages regarding their plans after high school (for example, through College Board, directly from colleges, or as part of financial aid scams), in addition to automated messages unrelated to college. This may lead to message fatigue. Therefore, students need clear, reliable cues that a message is important enough to pay attention to (or at least, to not delete or block the number). Students may not view the message beyond the banner notification they get when they receive a text, so the opening lines of a text are crucial to getting attention and establishing reliability.

Convey trust and credibility. Students receive a lot of text messages from different sources and often do not trust messages from unknown sources. Automated messages are often flagged as spam by cell providers or by recipients themselves. Part of breaking through the "noise" of automated text messages is establishing the student's trust in OtterBot and the information it shares. For example, students in the focus groups recommended repeated introduction messages and starting OtterBot messages with a flag to remind them what OtterBot is and to help them build trust in the source. Interestingly, many, though not all, students expressed a preference for short texts with a direct tone and content. Most students in the focus groups disliked messages that attempted to personify the bot, perceiving them as similar in style to scam messages.

Make use of referrals from trusted sources. Students are also well aware of cybersecurity and scam attempts, especially related to financial information. For example, many students in focus groups shared that they would not click a link directly, but instead want to see the full link address so they can assess it for themselves and potentially search for it online. A common student recommendation in discussions of trust was that they would be more likely to use the bot if they were introduced to it by a trusted person. Almost all students in the focus

29. Mostafa and Kasamani (2022).

groups indicated that their school, and particularly their counselors, were trusted sources of information, and many said their parents were as well. Because of this, and because college counselors are critical to getting better contact information for students, WSAC has been making a strong effort to reach out to counselors to inform them about OtterBot and find ways to encourage collaboration, as noted above.

Improve Awareness of Language Customization

Focus group research also found that while OtterBot has an embedded option and accompanying command to allow users to switch its language, most Spanish-speaking parents and students that had received OtterBot messages were not aware of the option to set their language to Spanish. Furthermore, instructions to switch language preferences were provided in English. To address this, introductory message campaigns should be sent in both English and Spanish (Latin/Central American Spanish). Instructions on how to change language preferences should also be in both languages.

PHASE 1 CONCLUSIONS AND NEXT STEPS

Phase 1 of the OTTERS project resulted in a rich set of findings and possible strategies for improvement. It showed the benefits of conducting formative research before undertaking an impact study and highlighted a number of strategies that could be used to improve OtterBot. Researchers studied a portion of these strategies in Phase 2, which focused specifically on changes that could be made to the text and visual design of messages and to how OtterBot shares information. As described in Box 2.3, other kinds of strategies (such as better outreach to college counselors) were implemented by WSAC for students enrolled in OtterBot. Additionally, the team recognized that information about the processes used in this evaluation could be valuable for other researchers and practitioners in this space, leading to the development of the forthcoming OTTERS Toolkit publication.

Phase 1 also surfaced findings and potential strategies that the team was not able to address fully in Phase 2. For example, Phase 1 identified barriers such as students facing a broad range of financial pressures and differences by ethnicity and gender — with Hispanic and male students less likely to engage with OtterBot, apply for financial aid, or enroll in postsecondary education or training, compared with some other groups. Most likely, these pressures and differences are due to systemic issues and will require more substantial interventions than can be provided by texting alone. The team is currently exploring a potential Phase 3 of the project that would expand OtterBot's capabilities to include connecting students and parents to additional, more intensive services.

BOX 2.3

Broader Changes Made as a Result of Phase 1 Findings, Outside of Changes to OtterBot Messaging

A major strength of the OTTERS project was that it was conducted in authentic partnership between researchers at MDRC and WSAC, and with WSAC's College Access Initiatives team, which focuses on designing and delivering college success initiatives. In Phase 1, the WSAC College Access Initiatives team acquired real-time feedback on the limitations of what information can be distributed through a chatbot and how to expand the team's reach and impact on college success. As a result, WSAC has launched several programmatic and strategic initiatives to improve communications and services provided not only to students, but also to the adults supporting them through the college and financial aid application process.

In addition to changes in OtterBot messaging (tested as part of Phase 2 of the OTTERS project), the WSAC team took several other steps in response to the Phase 1 findings, including:

- Conducting user testing of messages with high school College Bound students;
- Enhancing local event and scholarship opportunity messaging;
- Developing focused communications about OtterBot for college counselors;
- Creating OtterBot messages for parents that supplement messages delivered to students;
- Creating direct outreach via mail to students in the College Bound program introducing them to OtterBot;
- Connecting with higher education institutions about OtterBot messaging;
- Pursuing legislation (SB 6053) to help WSAC receive student contact data;
- Initiating messaging to ninth and tenth graders and their parents;
- Working with high schools, higher education institutions, and community-based organizations to create region-specific messages; and
- Updating their Mainstay contract to pilot district/region-specific communications for the fiscal year 2025.

Therefore, the OTTERS project's collaborative approach of involving both a research team and an agency directly involved in serving students offers a helpful model of how to close gaps between research and action.

3

OTTERS Project Phase 2: Redesign and Testing

In the second phase of the OTTERS project, MDRC researchers developed an alternative text messaging strategy based on Phase 1 insights, incorporating communication best practices and design principles from behavioral science. They then tested the impact of the alternative strategy against the standard approach.[1] The MDRC team also held monthly workshops with the WSAC team to identify the most timely and helpful content for students and conducted several user-testing sessions to determine whether students found the language appropriate and compelling. The focus on text messaging changes aligned with the project's phased approach, prioritizing lower-cost, easy-to-implement interventions before considering larger-scale changes.

REVISING OTTERBOT MESSAGES

This section summarizes the goals of the redesign and identifies some of the relevant design principles and changes used to achieve them.

Redesign Goal 1
Increase Student Engagement with OtterBot

High levels of reach and engagement are essential for OtterBot to achieve its broader goal of informing and motivating action. Some of the tactics and behavioral design principles the team used to revise text messages for increased engagement were as follows:

Ensure accurate contact information and awareness of customization options to increase reach and engagement. In the alternative messaging approach, introductory messages directly asked recipients to identify whether the phone number belonged to a parent or student, or if it was incorrect. This allowed WSAC staff to improve the reach of targeted messaging

1. CABS (n.d.).

designed specifically for either parents or students. Incorrect numbers (those that did not belong to a student or parent) were removed from all contact lists.

Improve awareness of language customization. Introductory messages in the alternative approach offered recipients the option of switching the message language to Spanish, enhancing comprehension for Spanish-speaking students and reinforcing their importance as a key audience.

Establish trust and credibility to overcome student distrust of text messages from unknown sources. In the alternative approach, initial message campaigns introduced OtterBot to the recipients and its goal while associating it with the well-recognized Washington Student Achievement Council (WSAC) name and with Washington State. Subsequent messages sometimes started with "*Hi, [name], this is OtterBot!*" to ensure that even if students did not save OtterBot as a contact, they recognized the messages as not being spam. Furthermore, rather than using a colloquial tone, the messages employed a relatively serious and official tone to convey authority. (See Box 3.1, Example 1.)

Encourage student responses and use them to customize content and reduce information overload. Compared with the standard messages, the alternative messages relied more on an interactive format that asked students to respond to request additional information on topics of interest and to answer questions about their current step in the journey. This approach not only aimed to keep students more engaged but also helped to customize messages and reduce the amount of irrelevant information that students received. (See Box 3.1, Example 2.)

Redesign Goal 2
Effectively Provide Information and Guidance to Help Students Navigate Financial Aid and Postsecondary Education Applications

Providing clear and actionable information is vital for helping students successfully navigate the complexities of the FAFSA and postsecondary education and training applications. Some of the tactics and behavioral design principles the team used to revise redesign text messages for clarity were as follows:

Simplify language and avoid jargon to make messages more helpful to students. The language used by the FAFSA and postsecondary enrollment and application guides and materials can be difficult to understand. The redesigned messages employed simple language and avoided jargon to make the information more accessible and less intimidating.

Engage parents to help them understand the process. Parents play an essential role in completion of the FAFSA, as well as other postsecondary education decisions and processes. For the alternative approach, the team designed campaigns and infographics that students could use to help their parents better understand their own roles and responsibilities in the application process. See Figure 3.1 for an infographic that was created for students to show to their parents.

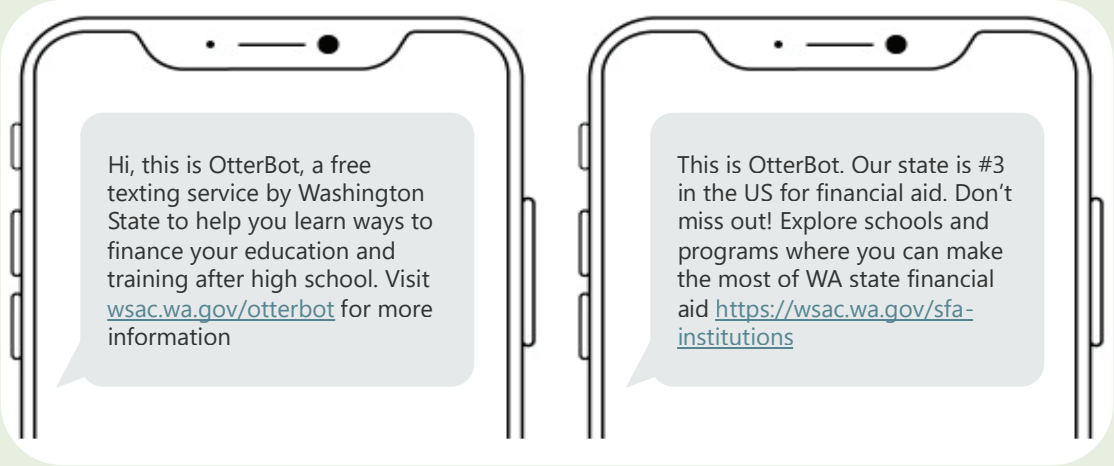
BOX 3.1

Sample Text Message Strategies

The examples below demonstrate how insights gained from Phase 1 were incorporated into the redesigned OtterBot messages for Phase 2.

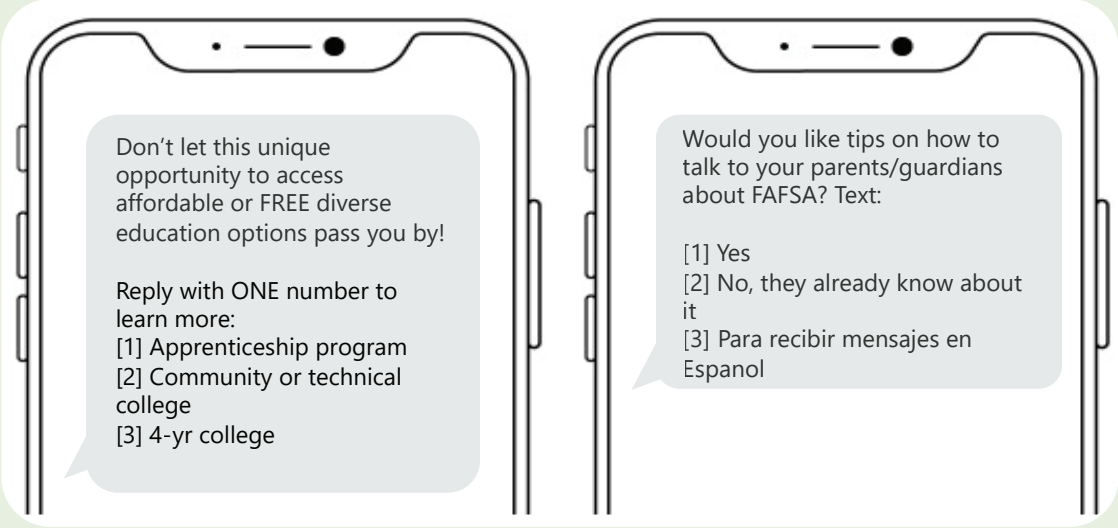
Example 1

OtterBot goal: Establish trust and credibility. **Strategy:** Repeatedly introduce OtterBot and associate messages with known and trusted entities including the state of Washington and WSAC.



Example 2

OtterBot goal: Improve engagement. **Strategy:** Provide closed-ended questions inviting students to request information specific to their interests and needs.

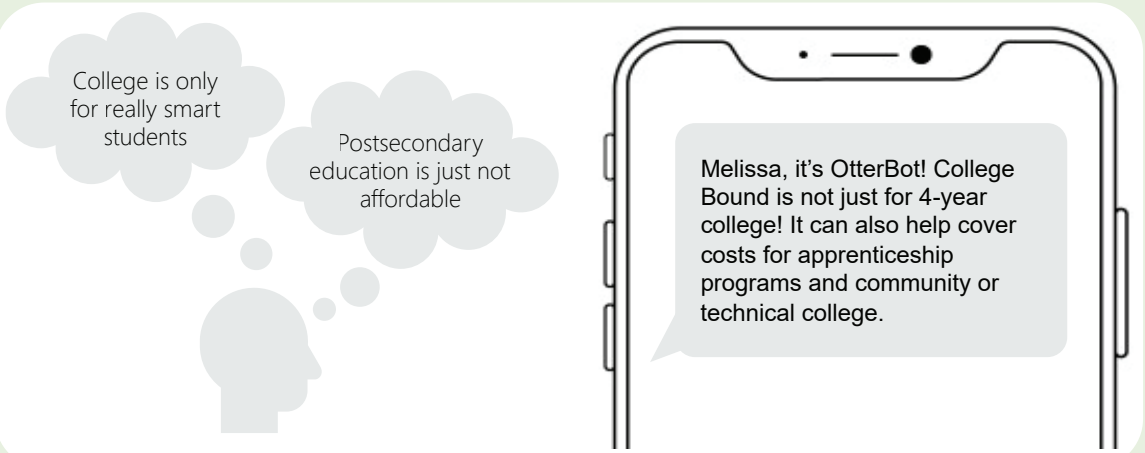


(continued)

Box 3.1 (continued)

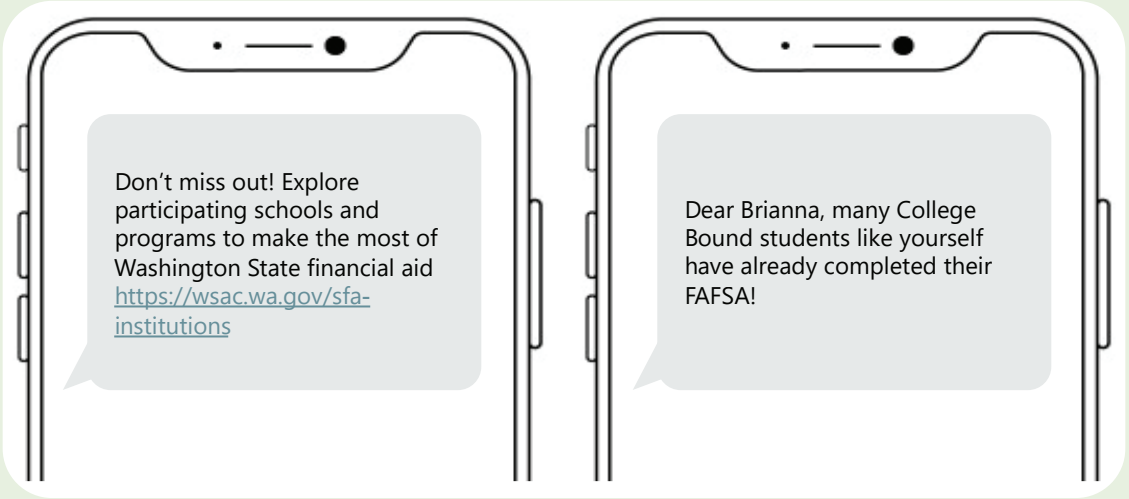
Example 3

OtterBot goal: Address mental models about academic fit and financial aid. **Strategy:** Repeatedly tell students about alternative postsecondary education paths that would be covered by College Bound.



Example 4

OtterBot goal: Nudge action. **Strategy:** Use principles such as loss aversion (example shown at left) and social proof (example shown at right) to develop reminders.



TOOLKIT SPOTLIGHT: To learn more about the behavioral science communication principles that were used to create these text messages, look for the forthcoming OTTERS Toolkit publication.

Figure 3.1. Infographic for Alternative Messaging Strategy

Redesign Goal 3
Address Behavioral Barriers Related to Enrollment in Postsecondary Education or Training

The team also revised and redesigned messages to address some of the behavioral barriers that hinder students from pursuing postsecondary education or training. Some examples of tactics and behavioral design principles employed were as follows:

Address mental models about academic fit. The team designed messages to increase students' self-confidence and suggest viable postsecondary paths for everyone, including options beyond the traditional four-year college trajectory, such as local community colleges or vocational schools. (See Box 3.1, Example 3.) For some of these messages the team segmented the audience based on GPA, to offer guidance that matched students' academic standings.

Offer clarification about postsecondary education and training costs. To reduce uncertainty about students' ability to afford postsecondary education or training, the alternative messaging emphasized that the College Bound funds cover tuition and other costs at many colleges and technical schools. The messages provided clear information about what is covered by College Bound, including tuition, fees, and book allowances, ensuring students understood their financial options and available support.

Nudge students to act. To encourage students to take timely action and avoid procrastination, the alternative messaging highlighted the unique, limited-time opportunity of College Bound. The team also employed techniques such as social proof, highlighting to students that their peers were also taking steps towards postsecondary education and training.[2] Additionally, messages regularly inquired about students' progress in the application process to keep them engaged. (See Box 3.1, Example 4.)

ESTIMATING THE EFFECTS OF ALTERNATIVE OTTERBOT MESSAGING ON OUTCOMES

The team designed and implemented an A/B test to examine the effects of the alternative messaging strategy. A/B testing is a statistical method, similar to a randomized controlled trial, in which participants in a program are randomly assigned to one of two groups ("Group A" or "Group B") who receive different versions of a program. At the end of the testing period, outcome levels are statistically assessed between the two groups to determine whether and to what extent one program has outperformed the other. It is important to note that there were significant issues with the rollout of the revamped FAFSA application process during

2. **Social proof** is a psychological and social phenomenon in which people imitate the actions of others around them, believing those behaviors are appropriate or correct for a given situation.

the data collection period. Therefore, the results that follow may not reflect what would have happened in a more typical school year.

Sample

In the OTTERS study, Group A, the "standard messaging group," consisted of College Bound seniors in the 2023-2024 class who were sent messages that closely mirrored the messages WSAC sent in the previous year to seniors. (The messages included some select modifications from WSAC, MDRC, and Mainstay, such as improving the translation practices for Spanish-speaking recipients and changing content to reflect the new FAFSA). Their peers in Group B, or the "alternative messaging group," received a novel set of messages. These messages were designed to address Phase 1 findings on student informational needs and perceived barriers to postsecondary education or training, challenges in OtterBot reach and engagement, and student reactions to and recommendations for improving OtterBot, as described in the previous section. The test assessed whether the alternative messaging strategy could lead to improved engagement levels compared with the standard messaging strategy. The research team is also assessing differences in longer-term outcomes. This report presents results for financial aid application completion, and results for postsecondary enrollment will be released at a later date.

The A/B analytic sample consisted of 10,263 College Bound seniors in the 2023-2024 academic year cohort who received the initial senior introductory OtterBot message for the 2023-2024 school year for their respective groups. There were 5,072 students in the standard messaging group and 5,191 students in the alternative messaging group. As shown in Table 3.1, the student characteristics of the A/B sample were similar to those of the sample used in the Phase I analyses. Furthermore, as expected there were no statistically significant differences between the standard messaging group and the alternative messaging group in terms of demographic makeup, GPA, or participation in academic programs (such as Running Start, dual credit programs, and College in High School) at the beginning of the school year.

Estimated Impacts on Engagement

Table 3.2 shows the estimated impact of the alternative messaging on measures of engagement (response and opt-out) and financial aid application completion. One measure of engagement indicated whether a student ever responded to an OtterBot message (and never opted out from OtterBot) during the study period (October 2023 through June 2024).[3] As shown in Table 3.2, rates of response were significantly higher among students in the alternative messaging group. Approximately 34 percent of these recipients responded compared with only 23 percent of those students who received the standard messaging. This represents

3. While the main response outcome assesses differences in rates of responding and never opting out, the research team also compared rates of ever responded regardless of opt-out between the two groups (not shown). For this measure, the positive impact on the alternative messaging group was even larger (12 percentage points higher).

Table 3.1. Baseline Demographic Characteristics of A/B Test Sample

Characteristic	Standard	Alternative	All	Difference
Gender (%)				
Female	52.1	51.2	51.6	-0.8
Male	47.1	47.7	47.4	0.6
Nonbinary	0.5	0.8	0.7	0.3
Race/ethnicity (%)				
American Indian or Alaskan Native	1.1	0.9	1.0	-0.2
Asian	7.9	8.4	8.2	0.5
Black or African American	8.4	8.5	8.5	0.0
Hispanic or Latino	42.8	43.7	43.3	0.9
Native Hawaiian or Pacific Islander	1.7	1.4	1.5	-0.3
Two or more races	7.3	7.2	7.2	-0.1
White	30.4	29.5	30.0	-0.9
GPA (%)				
1.9 or below	20.1	20.6	20.3	0.5
2.0 to 3.0	39.6	39.0	39.3	-0.5
Above 3.0	40.4	40.4	40.4	0.1
Population Density (%)				
Rural	23.1	23.5	23.3	0.4
Urban/suburban	76.9	76.5	76.7	-0.4
Sample size[a]	5,072	5,191	10,263	

SOURCE: MDRC calculations using data from WSAC.

NOTES: There were no statistically significant differences between the standard and alternative messaging groups.

[a]These values reflect the full sample sizes for the standard and alternative messaging groups. However, several students were missing baseline information. Specifically, 84 students were missing GPA in the standard messaging group and 72 students were missing GPA in the alternative messaging group. For both the standard and alternative messaging groups, 254 students were missing population density.

an 11 percentage point impact for the alternative messaging group and suggests that the alternative messaging, which also included more interactive messages, led to higher rates of engagement compared with standard messaging. While these results are promising, it is worth noting the research team also included some tests in which both messaging groups were sent the exact same message. As discussed in Box 3.2, in these instances, there were no differences in engagement rates between the two groups.

The research team also wanted to understand the extent to which the alternative messaging approach may have changed the likelihood of students remaining subscribed to OtterBot texts. Therefore, as was done for the Phase 1 analysis, the research team created a mea-

Table 3.2. Impacts of Alternative Versus Standard Messaging Approaches

Action	Standard Messaging (%)	Alternative Messaging (%)	Impact	P-Value
Ever responded and never opted out	23.0	34.0	11.0	0.000 ***
Ever opted out[a]	7.7	7.4	-0.3	0.521
Financial aid application completion[b]	54.1	55.4	1.3	0.122
Sample size[c]	5,072	5,191		

SOURCE: MDRC calculations using data from WSAC.

NOTES: The sample includes College Bound students in the 2024 graduating cohort who were sent the initial introductory OtterBot message for the 2023-2024 academic year. For p-values, statistical significance levels are indicated as follows: ***p < 0.01, **p < 0.05, *p < 0.10; nonsignificant values (p ≥ 0.10) are left unmarked.

[a]"Ever opted out" includes only instances when a student, as opposed to a parent, opted out of receiving OtterBot messages.

[b]"Financial aid application" includes both FAFSA and WASFA.

[c]Due to missing data, the total sample sizes for the outcome capturing financial aid application completion are slightly different from those shown in the table. For this outcome the sample size for standard messaging is 4,902 and 5,033 for alternative messaging.

BOX 3.2

Head-to-Head Tests of Engagement

While the engagement results for the alternative messaging group are promising, it is important to acknowledge that the alternative messaging group received more interactive messages than the standard messaging group. This difference could explain why the alternative messaging group actively engaged at higher rates.

To investigate this, the team conducted tests in which both the alternative messaging group and the standard messaging group received the same message. Theoretically, if the earlier OtterBot messages for the alternative messaging group were effective in promoting sustained engagement with the chatbot, then the alternative messaging group should continue to engage at a relatively higher response rate than the standard messaging group, even when both groups later receive exactly the same message.

One of these sets of messages included a "head-to-head" link test using a message that consisted of a clickable link embedded into the message body. In addition to this, the research team also fielded several one-question surveys to both groups asking closed-ended questions about students' postsecondary plans such as "How confident do you feel that you will continue your education after high school?" The team tracked response rates from both types of tests to understand if one group was more likely to click on a link or respond to the questions.

For both types of tests, response rates between the alternative messaging and standard messaging groups were similar.* On one hand, these findings may temper excitement about the main engagement analysis results. On the other hand, they may simply indicate that students are not likely to respond to OtterBot unless they see a concrete benefit to doing so (such as using it to get additional information on a topic of interest).

NOTE: *Overall, response rates were low, less than three percent, and answer patterns were similar for the alternative and standard messaging groups for all questions.

sure capturing whether a student ever opted out of receiving OtterBot messages. Table 3.2 shows that rates of students opting out were similar for the alternative messaging group (7.7 percent) and the standard messaging group (7.4 percent) and the difference was not statistically significant. Importantly, while it appears that the alternative messaging approach did not reduce the number of students opting out, overall rates of student opt-outs were low for both groups.

Because an early message sent to students in the alternative messaging group encouraged parents who were receiving the message on their students' behalf to opt out and provide updated contact information, the research team also assessed impacts on opt-outs in which the respondent said they were opting out because they were a parent. Rates of parent opt-outs

were higher among the alternative messaging group (3 percent) compared with the standard messaging group (1 percent). As noted earlier in this report, outdated contact information is a large barrier to reaching more College Bound students with OtterBot messaging, and one goal of the alternative messaging strategy was to help get updated contact information for both students and parents. Therefore, the higher rate of parent opt-outs among this group was in line with the intentions of the messaging.

Estimated Impacts on Financial Aid

The research team also estimated impacts on financial aid application completion, using records that indicated whether students had completed either a FAFSA or WASFA application without errors during the period ranging from December 2023 (when the FAFSA application went live) through September 2024. As mentioned previously, it is important to note that there were significant issues with the rollout of the revamped FAFSA application process during the data collection period. In particular, students in families with mixed citizenship status were not able to apply for financial aid until April. Therefore, the results that follow may not reflect what would have happened in a more typical school year.[4]

As is shown in Table 3.2, there were no statistically significant differences in financial aid application completion rates for students receiving the standard versus the alternative messaging. About 54 percent of students in the standard messaging group completed their applications compared with about 55 percent of students in the alternative messaging group.

In addition to examining overall financial aid application completion rates, the team also looked at impacts on early financial aid application completion. Early completion is important to assess given that it can offer students many advantages, including increased program decision flexibility, maximized scholarship opportunities, and access to limited funds such as Pell Grants and Supplemental Educational Opportunity Grants.[5] However, there were no significant differences in monthly completion outcomes between the two groups through June 2024.

Estimated Impacts by Subgroups

The team also explored subgroup impacts based on student characteristics that were identified as important through the Phase 1 research activities. These include ethnicity (Hispanic

4. As a point of comparison, among students receiving free or reduced-price meals, about 48 percent of students in the 2023 graduating cohort completed a FAFSA application compared with 46 percent in the 2024 graduating cohort as of October 8, 2024. See https://wsac.wa.gov/sap-dashboard, Washington Student Achievement Councill (2024e). Importantly, some groups may have been more impacted by the issues with FAFSA than others, and the changes to FAFSA have been especially problematic for students in families with mixed citizenship status. See Hoover (2024) or Martinez-Alvarado (2024).
5. William Peace University (2022).

versus not Hispanic), gender (male versus not male), population density (rural versus not rural), and grade point average (GPA < 2.0, GPA = 2.0–3.0, and GPA > 3.0).[6]

Gender. Impacts by gender are shown in Table 3.3. The alternative messaging increased response rates for both male students and students with other gender identities. While the alternative messaging did not increase financial aid application completion for female students or nonbinary students, it did lead to a statistically significant increase in financial aid application completion rates for male students. Among College Bound male students, 49 percent of those who received the alternative messaging completed a financial aid application compared with only 46 percent of those who received the standard messaging. Based on these data, it can be estimated that if all male students in the study had received the alternative messaging, an additional 141 students would have successfully completed financial aid applications, a milestone with the potential to change the trajectories of their lives. This is an especially important finding given that students who identify as male have lower rates of financial aid application completion than other gender identity groups, as shown in both Phase 1 and Phase 2. This is also encouraging given that making improvements to OtterBot messaging language is a relatively low-cost improvement.

The fact that this impact on financial aid application rates was limited to males may in part be explained by the growing body of research suggesting that career and technical education (CTE) programs may be a promising route for increasing postsecondary education and training among male-identifying students. A big part of the alternative messaging strategy was to highlight a broader range of postsecondary options including two-year degree programs and CTE programs as opposed to focusing primarily on four-year degree programs.

Ethnicity. When comparing the effects of the alternative messaging on students who identify as Hispanic to the effects on students of other ethnicities, impacts on engagement were similar (Appendix Table A.1). For both groups, the alternative messaging increased response rates and did not impact opt-out rates. However, opt-out rates for both the alternative and standard messaging groups were higher for non-Hispanic students. Neither group experienced impacts on financial aid application completion. As was the case in Phase 1, Hispanic students had lower rates of financial aid application completion than non-Hispanic students, suggesting that further work is needed to develop strategies that specifically address the needs and challenges of Hispanic students.

GPA. Phase 1 identified students with lower GPAs as a group who could be better served by OtterBot given their greater likelihood of opting out of OtterBot and lower rates of financial

6. As noted, these subgroups were identified as important in the Phase 1 work. Readers may remember that Hispanic students make up about half of College Bound students, but other racial/ethnic groups had rates of key outcomes that were higher. Similarly, rates of postsecondary enrollment and financial aid application completion were lower among males compared with other students. Through conversations with WSAC during the mapping process in Phase 1, the research team learned that geography could be an important factor influencing outcomes for students. Lastly, GPA was found to be one of the strongest predictors of successful outcomes. The GPA subgroups were created to align with message segmentation for messages sent in May 2024.

Table 3.3. Impacts of Alternative Versus Standard Messaging Approaches, by Gender

	Female/Nonbinary				Male					
Action	Standard Messaging (%)	Alternative Messaging (%)	Impact	P-Value	Standard Messaging (%)	Alternative Messaging (%)	Impact	P-Value	HT Statistic	
Ever responded and never opted out	23.9	35.9	12.0	0.000 ***	22.9	32.8	10.0	0.000 ***	1.28	
Ever opted out[a]	7.0	7.4	0.4	0.539	8.1	7.3	-0.8	0.328	1.29	
Financial aid application completion[b]	61.5	61.4	-0.1	0.926	45.9	48.9	2.9	0.021 **	3.02	†
Sample size	2,588	2,629			2,314	2,403				

SOURCE: MDRC calculations using data from WSAC.

NOTES: The sample includes College Bound students in the 2024 graduating cohort who were sent the initial introductory OtterBot message for the 2023-2024 academic year, and who had non-missing values for all three outcome variables. As a sensitivity check, the team also assessed impacts for the full analytic sample for both the ever responded and never opted out and ever opted out outcomes, and the results were similar. For p-values, statistical significance levels are indicated as follows: ***p < 0.01, **p < 0.05, *p < 0.10; nonsignificant values (p ≥ 0.10) are left unmarked. For the HT statistic, †p < 0.10 and ††p < 0.05.

[a]"Ever opted out" includes only instances when a student, as opposed to a parent, opted out of receiving OtterBot messages.

[b]"Financial aid application" includes both FAFSA and WASFA.

aid application completion and postsecondary enrollment. As shown in Appendix Table A.2 while response rates were highest among students with GPAs above 3.0 and lowest among students with GPAs under 2.0, impacts on response rate were similar for students of all three GPA groups (that is, 1.9 or below, 2.0 to 3.0, and above 3.0). However, impacts on rates of opt-out were different for the three groups. Specifically, the alternative messaging led to reductions in opt-outs among students with GPAs below 2.0, which is encouraging given a goal of Phase 2 messaging was to better serve students with lower GPAs. None of the three GPA groups experienced impacts on rates of financial aid application completion.

Population Density. Appendix Table A.3 compares the differences in impacts on key outcomes for students in rural geographies versus students in urban or suburban geographies. The alternative messaging increased response rates among rural and non-rural students. In addition, the messaging led to a reduction in opt outs among students in rural areas, suggesting that the alternative messaging strategy was better able to keep these students engaged. The alternative messaging strategy did not have an effect on financial aid application completion for either group.

4

Conclusions

The OTTERS Project aims to enhance OtterBot, an interactive chatbot, to improve financial aid application completion and postsecondary enrollment for students from families with low incomes. The first phase of the study focused on learning more about (1) student needs and perceived barriers to enrolling in and obtaining financial aid for postsecondary education and training; (2) student receipt of and engagement with OtterBot messages, levels of financial aid application completion and postsecondary enrollment, and associations among these outcomes; (3) differences among subgroups, based on student characteristics; and (4) student reactions to OtterBot messages and opportunities for improving OtterBot. Phase 1 of the OTTERS project resulted in a rich set of findings, some of which are being addressed as part of the project, and some of which will provide WSAC with a road map for potential improvements to make in the coming years.

In the second phase of the project, the team used insights from the first phase, along with behavioral science principles, to create an alternative messaging approach containing revised and new text messages. The team then compared the effects of the alternative and standard approaches on engagement with OtterBot and on rates of financial aid application completion. The study found that the alternative approach led to increases in students' engagement with OtterBot. While the alternative messaging did not increase financial aid application completion for female and nonbinary students, it did lead to a statistically significant increase in financial aid application completion rates for male students. Unfortunately, this phase of the study occurred in the context of a delayed and issue-laden FAFSA season, which may have affected these results. It should also be noted that Phase 2 tested one version of OtterBot messaging against another version of OtterBot messaging; therefore, the results show the effect of the change in messaging rather than the overall effectiveness of OtterBot.

While the changes made to OtterBot messaging had positive effects on engagement and financial aid application completion for male students, changes in messaging language alone cannot fully address all of the critical issues highlighted in Phase 1. However, with more substantive changes to OtterBot, the chatbot could be a crucial tool in connecting students and parents to more intensive services that can support them in financial aid application completion and postsecondary enrollment. A possible Phase 3 pilot study could focus on using a highly engaging OtterBot to connect students to regional and local supports and information, more fully integrate OtterBot with guidance counselor activities, connect students to services meant to support basic needs, connect students to peer mentors, or use generative AI to provide more customized and tailored educational support.

A number of states, organizations, and schools are using chatbots to increase access to postsecondary education and training and for other educational purposes. The process, tools, and methodologies from this project are applicable in many different settings where there is an interest in optimizing these types of interventions. An upcoming toolkit will present detailed information about the components of this project so that those components can be adapted and reused by others. Given the rapid expansion of the use of chatbots and similar navigational tools, this toolkit is poised to provide significant value — not only for chatbots but also for other educational technology solutions such as apps, digital agents, and websites.

The appeal of an intervention such as OtterBot is that it is a cost-effective and quick way to push out information to many students, which can free up time for guidance counselors and other staff to provide more personalized help to students and families. Compared with bots used by other states and organizations, OtterBot is very tech-forward, with a limited number of staff members that users can escalate questions to. The more human-centered approach used for some other chatbots, in which chatbots are used to supplement a large staff of advisors, is a more costly model, but it may be more effective in tackling some of the issues students face that cannot be fully addressed with chatbot messaging alone. Another exciting future direction for the field is the potential use of generative AI in developing bot content. Generative AI might be a low-cost way to generate personalized advice based on students' interests, academic records, and preferred institutions. More broadly, the OTTERS project has demonstrated the value of using a phased approach — consisting of user research followed by optimization and testing — to research educational technology platforms. This approach involves studying the intended user, the platform, and possible improvements to the platform to improve the tools and services before devoting time and resources to evaluating the effects of the platform in an impact study. This strategy could prove valuable in analyzing future educational technology initiatives.

APPENDIX

A

Supplementary Tables

Appendix Table A.1. Impacts of Alternative Versus Standard Messaging Approaches, by Ethnicity

	Non-Hispanic				Hispanic				
Action	Standard Messaging (%)	Alternative Messaging (%)	Impact	P-Value	Standard Messaging (%)	Alternative Messaging (%)	Impact	P-Value	HT Statistic
Ever responded and never opted out	24.1	34.8	10.6	0.000 ***	22.4	34	11.6	0.000 ***	0.27
Ever opted out[a]	9.9	9.2	-0.6	0.427	4.4	4.9	0.5	0.403	1.31
Financial aid application completion[b]	56.2	57.5	1.3	0.261	51.4	52.7	1.3	0.323	0.00
Sample size	2,786	2,810			2,110	2,218			

SOURCE: MDRC calculations using data from WSAC.

NOTES: The sample includes College Bound students in the 2024 graduating cohort who were sent the initial introductory OtterBot message for the 2023-2024 academic year, and who had non-missing values for all three outcome variables. As a sensitivity check, the team also assessed impacts for the full analytic sample for both the ever responded and never opted out and ever opted out outcomes, and the results were similar. For p-values, statistical significance levels are indicated as follows: ***p < 0.01, **p < 0.05, *p < 0.10; nonsignificant values (p ≥ 0.10) are left unmarked. For the HT statistic, †p < 0.10 and ††p < 0.05.

[a]"Ever opted out" includes only instances when a student, as opposed to a parent, opted out of receiving OtterBot messages.

[b]"Financial aid application" includes both FAFSA and WASFA.

Appendix Table A.2. Impacts of Alternative Versus Standard Messaging Approaches, by GPA

Action	1.9 or below				2.0 to 3.0				Above 3.0				HT Statistic	
	Standard Messaging (%)	Alternative Messaging (%)	Impact	P-Value	Standard Messaging (%)	Alternative Messaging (%)	Impact	P-Value	Standard Messaging (%)	Alternative Messaging (%)	Impact	P-Value		
Ever responded and never opted out	13.8	25.5	11.7	0.000 ***	22.7	33.8	11.1	0.000 ***	28.8	39.6	10.8	0.000 ***	0.15	
Ever opted out[a]	9.3	6.5	-2.8	0.018 **	7.0	7.6	0.6	0.456	7.0	7.6	0.6	0.433	6.73	††
Financial aid application completion[b]	18.7	21.4	2.8	0.119	48.5	49.5	1.0	0.531	77.0	78.2	1.3	0.329	0.65	
Sample size	974	1,015			1,933	1,968			1,984	2,042				

SOURCE: MDRC calculations using data from WSAC.

NOTES: The sample includes College Bound students in the 2024 graduating cohort who were sent the initial introductory OtterBot message for the 2023-2024 academic year, and who had non-missing values for all three outcome variables. As a sensitivity check, the team also assessed impacts for the full analytic sample for both the ever responded and never opted out and ever opted out outcomes, and the results were similar. For p-values, statistical significance levels are indicated as follows: ***p < 0.01, **p < 0.05, *p < 0.10; nonsignificant values (p ≥ 0.10) are left unmarked. For the HT statistic, †p < 0.10 and ††p < 0.05.

[a]"Ever opted out" includes only instances when a student, as opposed to a parent, opted out of receiving OtterBot messages.

[b]"Financial aid application" includes both FAFSA and WASFA.

Appendix Table A.3. Impacts of Alternative Versus Standard Messaging Approaches, by Population Density

	Suburban/Urban				Rural					
Action	Standard Messaging (%)	Alternative Messaging (%)	Impact	P-Value	Standard Messaging (%)	Alternative Messaging (%)	Impact	P-Value	HT Statistic	
Ever responded and never opted out	24.7	35.4	10.6	0.000 ***	19.21	32.02	12.81	0.000 ***	1.06	
Ever opted out[a]	7.0	7.6	0.6	0.312	8.76	6.34	-2.41	0.031 **	5.67	††
Financial aid application completion[b]	55.5	56.5	1.0	0.313	49.72	51.98	2.25	0.228	0.34	
Sample size	3,649	3,715			1,093	1,140				

SOURCE: MDRC calculations using data from WSAC.

NOTES: The sample includes College Bound students in the 2024 graduating cohort who were sent the initial introductory OtterBot message for the 2023-2024 academic year, and who had non-missing values for all three outcome variables. As a sensitivity check, the team also assessed impacts for the full analytic sample for both the ever responded and never opted out and ever opted out outcomes, and the results were similar. For p-values, statistical significance levels are indicated as follows: ***p < 0.01, **p < 0.05, *p < 0.10; nonsignificant values (p ≥ 0.10) are left unmarked. For the HT statistic, †p < 0.10 and ††p < 0.05.

[a]"Ever opted out" includes only instances when a student, as opposed to a parent, opted out of receiving OtterBot messages.

[b]"Financial aid application" includes both FAFSA and WASFA.

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Founded in 1974, MDRC builds and applies evidence about changes in policy and practice that can improve the well-being of people who are economically disadvantaged. In service of this goal, we work alongside our programmatic partners and the people they serve to identify and design more effective and equitable approaches. We work with them to strengthen the impact of those approaches. And we work with them to evaluate policies or practices using the highest research standards. Our staff members have an unusual combination of research and organizational experience, with expertise in the latest qualitative and quantitative research methods, data science, behavioral science, culturally responsive practices, and collaborative design and program improvement processes. To disseminate what we learn, we actively engage with policymakers, practitioners, public and private funders, and others to apply the best evidence available to the decisions they are making.

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