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Alignment of educational aspirations and career plans in high school with Mobile app technology

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Abstract

Init2Winit is a gamified mobile application designed to promote college and career knowledge among adolescents. Init2Winit offers students multiple opportunities to explore college and career pathways using game tunnels; this tunnel play informs students' understanding of how mis/aligned choices can have varying consequences for their future. Our study examines player performance in the career tunnel—where students attempt to align their educational expectations with chosen career pathways. Students earn points when their educational expectations are correctly aligned with their desired careers and expected salaries. Init2Winit was tested in Midwest urban and rural high schools using a sample of 186 high students. Results show that students who earned high alignment scores increased their college-going expectations. Subsequent game plays increased students' alignment between college choices, career plans, and realistic salary projections.

Keywords Alignment · Aspirations · Career plans · Mobile app

1 Introduction

The need for higher education is a message very familiar to US high school students; overwhelmingly, most students assume they are going to college, regardless of their economic and social resources (Aud et al. 2012; Deming and Dynarski 2010; Robb 2017; Robb et al. 2012; Schudde and Brown 2019; Snyder et al. 2016). These assumptions are problematic; oftentimes students' college ambitions are not consistent or realistic with their occupational interests and academic performance. The relationship between educational expectations and occupational choices has been referred to as

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alignment and signifies coherence between a desired career and the requisite education necessary to obtain it (Anonymous 1999; Anonymous 2017; Carnevale et al. 2013; Rowan-Kenyon et al. 2011).

Researchers have proven that the majority of low-income racial and ethnic minority high school students lack information about college preparation, cost, and available financial aid (Bettinger et al. 2012; Cataldi et al. 2018; Cohodes and Goodman 2014; Deil-Amen and DeLuca 2010; DesJardins and McCall 2014; Houle and Addo 2019; Hoxby and Avery 2013; Horn et al. 2003; Jury et al. 2017; Lowry 2017; Renbarger and Long 2019; Rios-Aguilar et al. 2011). New tools are necessary to address the growing complexities for aligning a successful pathway following high school graduation. While most low income and minority students have cell phones, a substantially fewer number have computer access at school, home, or in their communities (McFarland et al. 2019; Oreopoulos and Petronijevic 2013; Oymak 2018; Perrin 2017). It is no wonder, then, why educators and researchers are transitioning to smartphone and tablet devices for e-learning pedagogy and measurement.

Init2Winit is a mobile app designed to increase students' awareness of, access to, and alignment between college knowledge and career planning (Anonymous 2019a, b). The developmental study described in this paper was designed to determine: (1) is playing Init2Winit app associated with increases in college, career, and earnings alignment; and (2) is alignment knowledge from game-play associated with increases in college-going expectations. Results show an increase in players' alignment knowledge that is positively associated with their self-reported college-going expectations from fall to spring 2018–2019. Students with multiple plays are more likely to increase their college-going expectations.

1.1 College and career ambitions and knowledge

When adolescents can identify the occupation that they hope to have in their future and the requisite educational requirements for that job, they are described as having aligned ambitions. Low-income minority students are proportionately more likely to have misaligned educational ambitions than more advantaged students (Dillon and Smith 2017; Jacob and Linkow 2011; Perry et al. 2016; Smith et al. 2013). Low-income students are more likely to have misaligned ambitions due to a lack of information (Avery and Kane 2004; Sabates et al. 2011). This lack of information can have deleterious effects on students' efforts to properly plan and execute a successful transition out of high school and into their next phase of adulthood in the academy or the workforce (or both!). Init 2 Winit is designed to help students learn more about the pitfalls of choosing colleges unaligned with their goals, avoiding college financial debt, improving college application scores, and learning more college choice options.

Given the pervasiveness of mobile technology among adolescents (Pew Research Center 2017; Anderson and Jiang 2018), gamified apps could be another channel for realistically shaping students' educational expectations and occupational aspirations. Gamification involves the use of game elements in non-game contexts to motivate users to perform tasks effectively aiming at psychological and behavioral changes (Deterding et al. 2011). Applying game design elements in learning activities have shown positive impacts on students' engagement, academic achievement, and emotion toward learning in different ages and subjects (Klimova and Kacet 2017; Sánchez and

Olivares 2011). The development of gamified apps provides educators with innovative tools to promote student engagement in learning activities and impact their academic, emotional and social learning. (Luna-Nevarez and McGovern 2018; Hamari et al. 2016).

Many educational apps appeal to students with gamified learning contents in various subjects such as language acquisition, science, business, computer (Singh 2018; Klímová 2017). With the complex decisions adolescents face when deciding their next steps after high school graduation, mobile games can attract students to learn about college and career pathways through a medium that can be to increase knowledge and at the same time be personally rewarding and enjoyable.

Although smartphone interventions that provide additional information beyond counselors and websites are available (Kramer 2020), most current applications for obtaining information regarding educational and occupational interests are modular in design; the Init2Winit app contains this same information in a dynamic game design. One option that has not been fully tapped or evaluated is the use of mobile phone apps in a *serious gamified context*. A gamified app that helps students navigate the likely outcome of their education and career choices could offer an unusual opportunity, especially if the information delivered is accessible, personally rewarding, and enjoyable.

While some educational technologies have been used to assist minority and low-income students with navigating their college (Page and Gehlbach 2017) and career (Pordelan et al. 2020) pathways, serious mobile gamification in this field is ripe for development and systematic evaluation (Kumar and Chand 2019). Init 2 Winit games are unusual in that they focus exclusively on college and career planning to further establish goals, timelines, and resources. Given the cost-effective nature of mobile app technology (Castleman and Page 2015), Init2Winit is in a rare position to quickly disseminate information with instant feedback not readily available in formal classrooms, career counseling, or informal settings outside of school while keeping expenses to a minimum. The unprecedented use of a gamified approach to accomplish these goals is both the aim and the unique value of this study.

2 Init2Winit: A mobile serious game to simulate college and career navigation

Using a mobile platform, Init2Winit employs a dynamic game design where students can envision and enact themselves in a diverse range of career and education pathways. Depending on the choices they make in the game, and then can learn through trial/error in gameplay about how to translate that vision into action.

The intent of Init2Winit is for students to visualize themselves in a career/college pathway and learn through trial/error in gameplay about the benefits of choosing certain education pathways, career choices, and earnings rather than others. The promise of the game is that educators can utilize this digital tool to engage students who may not be invested in their college and potential career choices. Recognizing the prevalence of smartphone use among adolescents and building information games that they could play numerous times, our team set about designing an app to assist students in making a successful transition from high school to postsecondary school and the labor force

(Anonymous, 2019a, b). We sought to investigate if Init2Winit could enhance the alignment between college ambitions, career plans, and salary expectations for low income and minority high school students. Specifically, we investigated the following questions:

(RQ1) Is playing Init2Winit associated with increases in college, career, and earnings alignment?

(RQ2) Is alignment knowledge from Init2Winit game-play associated with increases in college-going expectations?

3 Init2Winit development and design

The overall design of Init2Winit aims to help students learn more about the pitfalls of making unaligned choices between their college and career goals, avoiding college financial debt, and understanding college choice options. Applying game design elements in learning activities have shown positive impacts on students' engagement, academic achievement, and emotion toward learning in different ages and subjects (Ameri et al. 2020; Herodotou 2018; Klímová 2017; Xiangming and Song 2018). The final Init2Winit prototype integrates data-based analytics with occupational information algorithms into a tunnel system that allows users to make choices and receive points for identifying correct responses. It is *one of the first serious mobile games* to combine a personalized exploration of education choices and career goals to assist them in examining their own individualized education and career pathway.

3.1 Back-end

The back-end development is responsible for 'behind the scenes' computer programming that controls functions, management, and processing of all game content. Our research team partnered with Hokiya, a Twianese company, to develop an Android demo using open access software. A predictive algorithm based on student responses was fed into a structured interface that gives students points for selecting aligned career and education choices. The occupational algorithms, based on what types of degrees or certificates are needed for different jobs, are derived from the Occupational Information Network (National Center for O*NET Development n.d.). The resulting score provides the students with feedback and a chance to play the game again if they are interested in learning about the educational requirements for different careers.

3.2 Front-end

Front-end design focuses on those components of a game that the user will see and interact with—namely, the graphics, user interactive functions, and audio components. User-driven designs and feedback are crucial to the efficacy of any educational tool or intervention. An important consideration for the Init2Winit user experience (UX) design was to emphasize importance of keeping the students' attention with a solid game template that highlighted for the students something they might not know that could be useful for their future education and careers, not simply grabbing the students' attention with fancy graphics. On the other hand, if the app was to be game-based and

not just an informational source like a website, the design needed to reflect the interests and concerns of high school students. Otherwise, the students would not likely be motivated to play or keep playing.

Grounding the UX design of Init2Winit with current research findings, our research team invested a significant amount of time developing age-appropriate and socially relevant material that allowed students to take an active role in developing their own goals (Kumar and Chand 2019). We conducted field testing on the design and graphics of the app in local urban and rural middle and high schools. More specifically, our design feedback tests were disaggregated at the grade level to ascertain design preference and interest for each separate age group. Graphic and audio design wireframes were constructed based on student focus groups and polling results. Hokiya wrote the necessary coding for audio and visual design, followed by alpha-testing of the design prototypes conducted by our research team with focus groups in schools near East Lansing, Michigan. A fuller test was conducted in spring 2019.

3.3 Onboarding

Upon opening the app interface, the user first sees the login screen (Fig. 1a) and starts the game by logging in with a given username and password. They then land on the

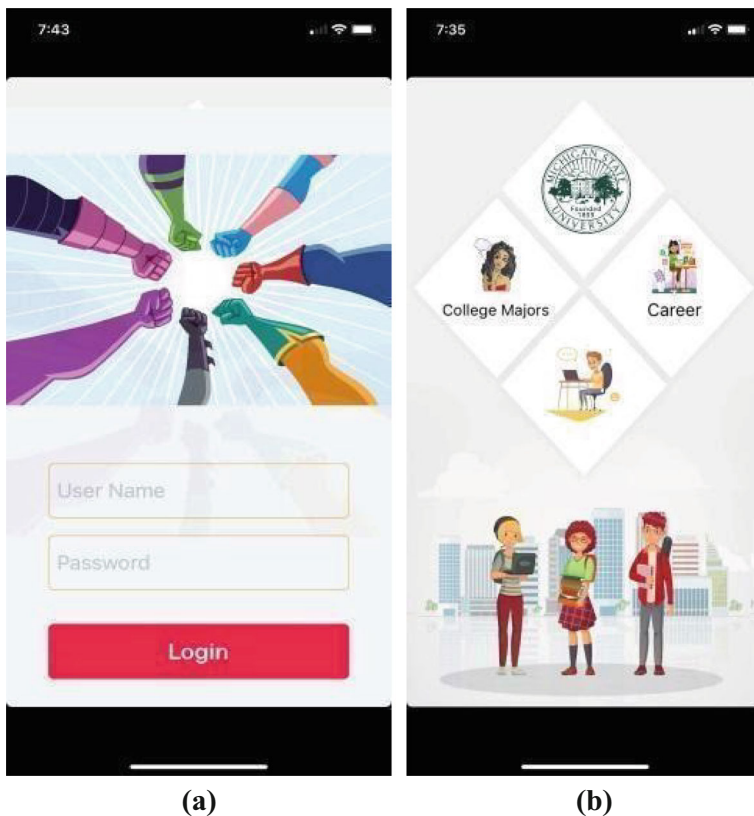


Fig. 1 Screenshots of the main onboarding tabs of the Init2Winit app are shown, including the (a) login screen, and (b) tunnel choices

tunnel tab (Fig. 1b) where they can select either the career or college major tunnel for further play. Choices are tracked in real-time using a built-in iOS and Android information notification system and updated every five minutes.

3.4 Career tunnel exploration

After the user selects one tunnel to play, arriving on the field choice tab. This tab is set up as a self-directed exploration of a career/job; there are more than 18 sub-fields and 50 job titles for students to explore. When students scroll down, they are shown the sounds and photographs corresponding with each sub-field and job.

Once they click on a job title, they arrive on the education choice tab. Students are then given the opportunity to choose a college option they believe would be needed to obtain their specific job choice. Next, students are then presented with the salary tab, where students are asked to make a salary projection for their specific job choice. Students are given four different salary ranges to choose from. To earn points in the game, a student attempts to match a college major with a desired occupation and estimated yearly earnings of that job.

3.5 Points system

Init2Winit embeds a reward point system: the stronger alignment between education ambitions and career pathways, the more points students earn, resulting in redeemable rewards such as connecting with alumni, and opportunities to attend various education and career activities at local colleges. These tangible rewards offer students a deeper, more nuanced understanding of enacting their ambitions in specific fields and through learning more about them and receive concrete rewards and motivates them to keep playing.

If the choices are misaligned, they can always try again based on this feedback or select a new field or job title. This cycle of real-time feedback, along with the points system, aims to facilitate learning experiences, as students focus on their scores and modify their choice of jobs, education, and college majors.

3.5.1 Two points for alignment

Students whose educational expectations realistically corresponded to their career plans and salary projections were considered to have fully aligned ambitions. Figure 2 shows a student who chooses a counseling career, plans to receive a four-year college education, and predicts earning a \$45 to \$60 K yearly salary will earn the full alignment score of 2 points. The student earns one point for correctly aligning the amount of education typically needed to be a school counselor and earns one point for correctly choosing an appropriate salary for a counselor. Students can earn full alignment scores through a myriad of different combinations; aligned students could also include those who do not expect to receive a four-year degree, but plan to attend a technical or trade school after high school and earn \$35,000 as a hairstylist. Students in this category, who can match different aspects of post education technical training/ and or certificates, should have increased chances for being prepared for a specific job, thereby reducing the likelihood of unemployment.

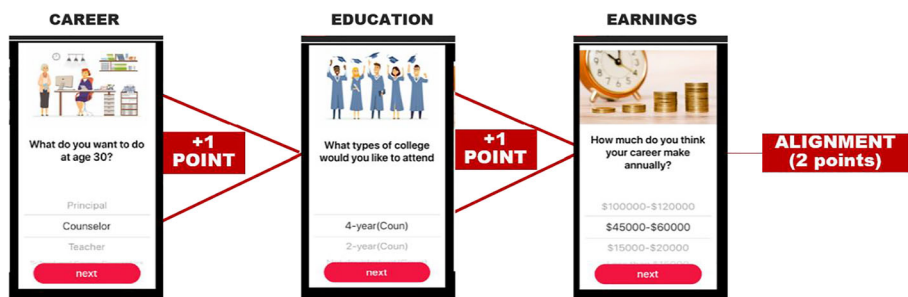


Fig. 2 The alignment pathway in the point reward process

3.5.2 One point for misalignment

Students whose educational expectations realistically corresponded to either their career plans or salary projections (but not both) were considered to have misaligned ambitions, as they were unable to choose correctly for both components of the career pathway. Both “over”- and “under”-aligned ambitions indicate misalignment. Under-aligned students are those who desire a job that requires a bachelor’s degree and are able to correctly choose a realistic salary range, but do not expect to attend a four-year college and are unaware of the requirements for a job. Figure 3 is an example of under-aligned gameplay: the student chooses a teaching career and is uncertain about educational plans, but correctly predicts earning a \$45 to \$60 K yearly salary, ultimately earning a score of 1 point. This student has been rewarded only 1 point because of the job-to-salary choice, not the job-to-education plan. A student, like this example, with an under-aligned career pathway could result in a delayed or reduced chance of subsequent enrollment or completion in a college program.

Conversely, students with over-aligned college knowledge have educational expectations that supersede what is necessary for their career choice, or they over-estimated possible annual salaries in their career choices. For example, a student who selects “schoolteacher” and choses a PhD for the education screen, would be misaligning their educational requirements for a teacher career choice and only awarded 1 point if they correctly identified the salary for a schoolteacher (see Fig. 3). This over-aligned career pathway also an indication of a misunderstanding in the education requirement for a teaching degree, and can influence the uncertainty of future educational attainment, employment and income potential (Schmitt-Wilson and Faas 2016; Sabates et al. 2011).

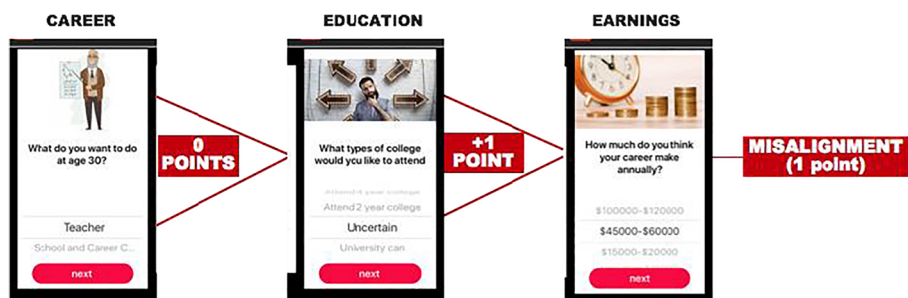


Fig. 3 The misalignment pathway in the point reward process

3.5.3 Zero points for no alignment

Many adolescents have unrealistic ambitions regarding their future occupational aspirations and the education needed to attain these goals, especially for students from low-income families. Low-income minority students are proportionately more likely to have misaligned educational ambitions than more advantaged students (Smith et al. 2013). Figure 4 is an example of no alignment gameplay whereas students neither know the required education to be a doctor nor the potential income of a doctor career. Low-income minority students with no alignment knowledge tend to have inadequate academic preparation and an unrealistic understanding of the education and career opportunities for their future.

3.6 Career tunnel results

Finally, users arrive on a corresponding result tab (see Fig. 5), depending on their alignment score just earned during game play. Users are given information, feedback, and points, based on their education—career—salary alignment score.

4 Methodology

4.1 Sampling

Several high schools, who had participated in other college interventions, expressed a desire to be a part of this study (see Anonymous 2014). This resulted in contacting and involving two purposively selected high schools—one in an urban the other in a rural area. Both schools had lower than the state average in college enrollment and high school students whose test scores were lower than the state average and whose families were less likely to have advanced college degrees. The urban school has a population of 84% economically disadvantaged students and 72% minority students. The rural school has a population of 40% economically disadvantaged students and most students are white (Michigan Department of Education 2019). In the fall semester of 2018 (September to November) students were asked to complete a survey, which collected information on their demographic characteristics, parent education, GPA, career plans, educational aspirations, and interests in STEM majors. A follow-up survey was

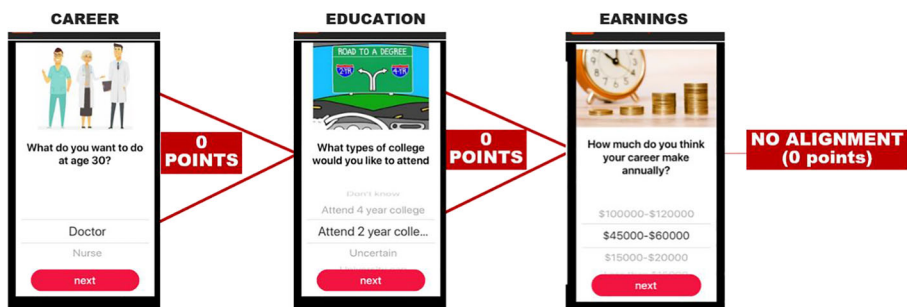


Fig. 4 The unaligned pathway in the point reward process

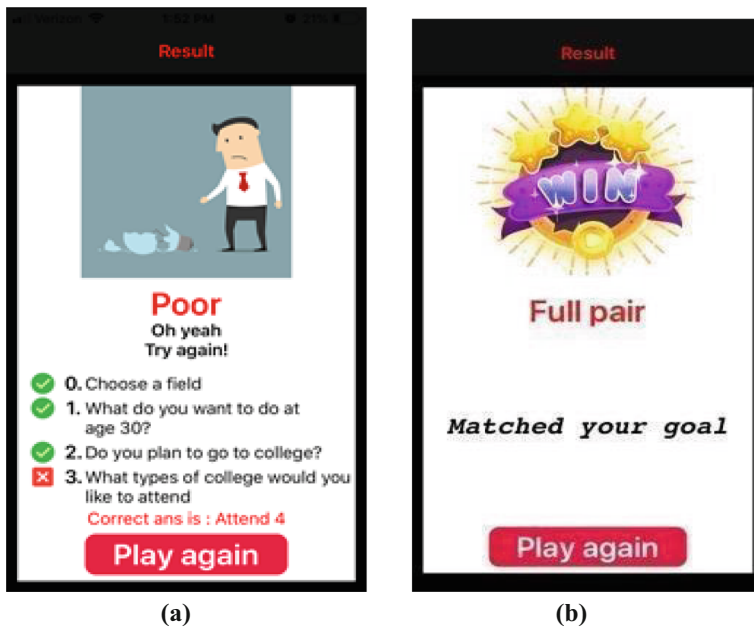


Fig. 5 Screenshots of the results tabs of the Init2Winit career tunnel

collected in the spring semester (March to May) that asked specifically about college plans. The response rate of the fall survey was 81%, and the response rate of spring survey was 82%.

This resulted in a sample size of 186 adolescents who activated their mobile app account with valid records of app activities. The descriptive statistics of mobile app users are reported in Table 1. Participants include 26% white, 9% Black, 26% Asian and 40% multi-racial and Mid-eastern students. Student user's average GPA is 2.92 ($SD = 0.71$) with educational expectations ranging between obtaining a bachelor to a master's degree. The majority of Init2Winit users are minority and 11th graders (89%). Nearly three fifths of parents lack a college degree, 26% had a degree less than high school and 40% had a high school degree. Among 186 users, 75% played games more than once and nearly 35% played 3–4 times during the beta-testing period.

4.2 Procedures

In the two sampled schools, the counselors and college advisors received instruction on administering the app and worked with the research team to administer the survey and collect data from users and non-users. Professional workshops were given over several days, demonstrating the features of the mobile app, the overall content, the questions in each tunnel, and the incentive value of the point reward system. The research team also worked with counselors and advisors to instruct students in the pre-tutorial game, which described how to download Init2Winit, and how to activate the app on their own phones (activation occurs by clicking on a pre-loaded link that assigns students' account information and passwords). Additionally, school staff were also briefed on using nudge recruiting messages.

Table 1 Descriptive statistics of users by alignment status in 1st job play

	Overall	No alignment	Misalignment	Full-alignment
	Mean (Sd)	Mean (Sd)	Mean (Sd)	Mean (Sd)
GPA	2.92 (.71)	2.63 (.70)	2.83 (.69)	3.13 (.69) a
Educational expectations in Fall	5.69 (1.27)	5.44 (1.09)	5.90 (1.32)	5.63 (1.31)
Educational expectations in Spring	5.33 (1.10)	4.31 (1.30)	** 5.48 (.95)	a 5.86 (.84) **
	%	%	%	%
Number of alignment knowledge				
No aligned play	0.20	0.38	0.34	0.00
1 aligned play	0.40	0.38	0.41	0.40
2 aligned play	0.18	0.00	* 0.10	0.31 a
3–4 aligned play	0.11	0.06	0.10	0.14
More than 5 aligned play	0.11	0.19	0.03	a 0.14
Mobile App Plays (per user)				
Play 1 time	0.20	0.25	0.10	0.26
Play 2 times	0.26	0.19	0.34	0.23
Play 3–4 times	0.35	0.31	0.38	0.34
Play 5–8 times	0.10	0.06	0.14	0.09
Play more than 8 times	0.09	0.19	0.03	a 0.09
Parent highest education				
Less than HS	0.26	0.25	0.24	0.29
HS degree	0.40	0.50	0.45	0.31
Some college	0.10	0.06	0.07	0.14
Beyond college	0.24	0.19	0.24	0.26
Demographics				
Female	0.41	0.56	0.48	0.29 a
White	0.26	0.31	0.28	0.23
Black	0.09	0.06	0.10	0.09
Hispanic	0.01	0.00	0.00	0.03
Asian	0.24	0.25	0.28	0.20
Others (Multi-racial, Mid-Eastern)	0.40	0.38	0.34	0.46

Note: For continuous variables, a two-tailed t-test was applied. For categorical variables, z-test was applied to test group differences

a. $p < .05$, two-tailed tests comparing each alignment status group with the no-alignment group

*** $p < .001$ ** $p < .01$ * $p < .05$, two-tailed t-tests comparing each initial level of alignment knowledge with the overall sample group

Students were administered a survey before the launch of the mobile app in fall and again after completion of the app test in spring. There were 110 students who

completed both fall and spring surveys and had valid user data and other covariates. Rates of missing data in the spring survey were higher than fall survey, but there were no between-group differences in missing data according to alignment knowledge (no alignment vs other groups of alignment knowledge) status ($P > .05$).

Mobile app usage was obtained from the student phones and housed on a secured server. A program recorded the frequency of plays per day, the duration of each play, and the number of plays a student took to obtain the correct aligned answer for a specific job. The Daily Active Users (DAU) displays the number of unique users who record at least one play of Init2Winit from May 3rd to May 29, 2019 which can be found in Fig. 7.

4.3 Measures

The student survey measured college-going educational expectations which students were asked, “How far in school do you think you’ll get?” The scale ranged from 1 (less than high school completion) to 7 (complete a Ph.D., M.D., law degree, or other high-level professional degree). They were given a choice of different education pathways from high school through advanced degrees (e.g., Ph.D., masters, bachelors, vocational technical school certificates, associate degree, high school degree, or GED). Students who expected to obtain a college degree or advanced degrees beyond college were coded as 1, other educational expectations were coded as 0. Parent education was measured by students’ responses to the question, “What is the highest level of education any of your parents have completed?” The scale ranges from 1 (less than high school) to 4 (college completion and beyond).

Gender was coded as a dummy variable (female =1; male =0); race and ethnicity included four groups of students’ backgrounds: White, Black, Hispanic, Asian and others (including Mid-eastern and multiracial). Grade level was coded as a dummy variable.

5 Data analysis

There were two phases for measuring the impact of alignment, that is the match between college plans and career choices and corresponding income. In phase one we measured user alignment knowledge during the beta testing. Specifically, we tracked users’ scores in the career tunnel during play to examine whether they gained or improved their alignment knowledge. Two crucial measures were identified to represent students’ alignment knowledge: (1) number of full-alignment plays and (2) initial level of alignment knowledge in the primary job (1st job play).

The number of full-alignment plays measures job-specific knowledge when a student chooses a job and then correctly aligns their educational plans and knowledge about potential annual earnings for that job. Students with more aligned plays in the career tunnel earned higher scores, indicating a stronger alignment for specific pathways to attain their desired jobs. However, while the number of full-alignment plays measured students’ alignment knowledge their resulting score could be inflated because some of them may have chosen the same job repeatedly to earn more reward points.

There were three levels of alignment knowledge for the primary job including (1) full-alignment, (2) misalignment, and (3) no alignment. We assume that some students with full-alignment would have some advantages given their school GPA and college-going expectations. By tracking users' playing activities during beta-testing and profiling users' pathway from the 1st job to the 2nd job, this phase aimed to understand students' alignment knowledge and whether students learned and improved their alignment knowledge from play-to-play.

For the first phase, we profiled users' app data and the initial level of alignment knowledge. Tracking users' pathways from the 1st job to the 2nd job examines the difference between the initial level of alignment knowledge and the number of full-alignment plays.

The second phase was a further examination for understanding the relationship between alignment knowledge and college expectations after game play. To examine whether numbers of full-alignment plan and full-alignment knowledge in the 1st job increased students' college-going expectations, we employed a multiple regression model. Additionally, we applied a logistic regression to examine whether a student's number of full-alignment scores and initial level of alignment knowledge was associated with increases in their college expectations in spring.

6 Results

6.1 Phase one

Figure 6 shows the alignment tree of 1st and 2nd plays of specific jobs during phase one. For 1st play in the career exploration tunnel, 39% of students had full-alignment knowledge (A2), 41% were misaligned (A3), and 20% had no alignment knowledge (A4). The proportion of A2 students is significantly larger than A4 students ($z\text{-test} = 2.00$, $p = .04$), indicating slightly more than one third of users knew the alignment knowledge in their primary job. This is somewhat surprising given that is approximately the same percentage as found in previous literature (Anonymous 1999).

After the 1st play, 139 students (about 75%) of users initiated a 2nd round of play in the career exploration tunnel. In their 2nd attempt, 52% ($73 = B2 + C2 + D2$) of students obtained full-alignment knowledge, which is significantly higher than the proportion of students with alignment knowledge in the 1st play ($z\text{-test} = 2.15$, $p = .03$). This improvement indicates that more students obtained alignment knowledge during their 2nd round of play than their 1st. To further understand what kinds of misalignment that are more likely to occur for low-income students, we report the misalignment regarding whether it is over- or under-aligned in the annual income decisions. Among the A3 misalignment group, 89% of students have under-aligned knowledge between career and annual income and 11% students had over-aligned knowledge between career and annual income, indicating low-income students tended to under-estimate their earnings potential in their desired jobs. The descriptive statistics indicate that students from disadvantaged backgrounds tend to be under-aligned, underestimate their earnings potential, but obtain alignment knowledge during the second play. Although very preliminary it is surprising that playing the game a second time provided a substantial increase among the users.

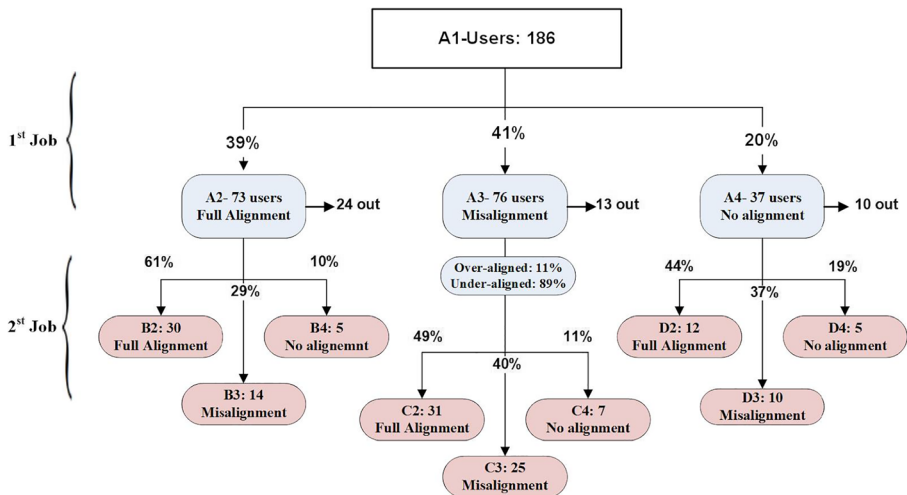


Fig. 6 Alignment tree of the 1st and 2nd attempt of playing on career tunnel

Table 1 presents descriptive statistics by all users and the three initial levels of alignment knowledge for the 1st job play. As expected, students with full-alignment knowledge in the 1st job play have significantly higher educational expectations ($p < .01$) and students with no alignment knowledge in the 1st job have significantly lower educational expectations ($p < .01$) compared to all users in the sample. Few females are observed to have full alignment knowledge in their 1st job choices compared to those with no alignment knowledge. It is important to note that even students with misalignment knowledge in their 1st job have relatively higher spring educational expectations compared to their initial ones.

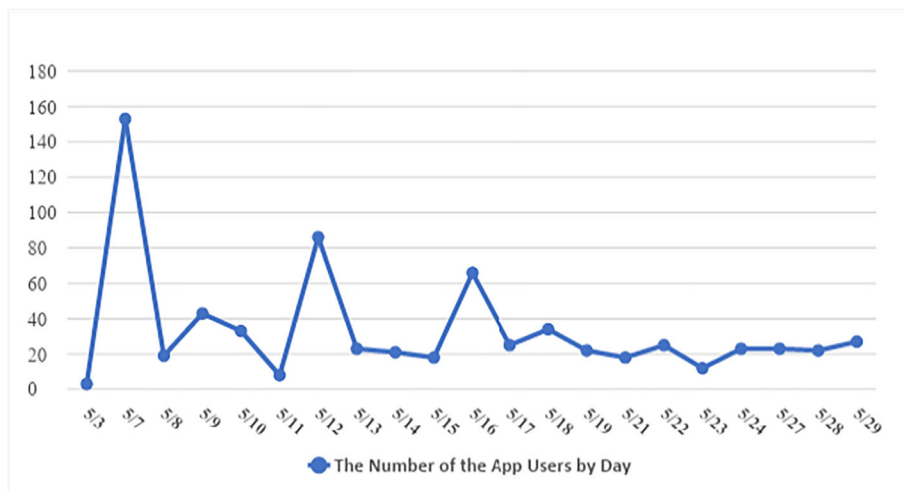


Fig. 7 Record of the daily active users

6.2 Phase two

In phase two, we conducted logistic regression models to test whether students who increased their full alignment knowledge during game play had higher college going expectations in the spring (controlling for our pretest measure of fall college-going expectations). Significant results in Model 2 of Table 2 confirm this hypothesis. The more college

Table 2 Logistic Regression of College-going Expectations in 2019 spring

	Model-1	Model-2	Model-3
	b/se	b/se	b/se
GPA	3.755 (0.731)	1.973 (0.758)	1.535 (0.613)
Educational expectations in 2018 Fall	2.819** (0.391)	3.774** (0.496)	1.858* (0.279)
Mobile App activities: College Knowledge n of full-alignment plays		4.095* (0.700)	
(Ref. No-alignment knowledge in the 1st job)			
Misalignment knowledge in the 1st job)			1.547 (.950)
Full-alignment knowledge in the 1st job)			1.388 (1.143)
Number of unique job play			3.528* (0.562)
Demographic characteristics			
Female	1.036 (0.994)	0.645 (1.090)	1.359 (1.003)
Black (Ref. White)	0.173 (1.820)	0.089 (2.047)	0.074 (1.975)
Asian	0.744 (1.404)	0.972 (1.500)	1.002 (1.480)
Others	0.619 (1.352)	0.580 (1.455)	0.424 (1.427)
Parent: HS degree (Ref. Less than HS)	1.892 (1.031)	1.072 (1.136)	1.325 (.957)
Parent: Some college	1.921 (1.101)	1.882 (1.087)	1.702 (1.112)
Parent: Beyond college	2.041 (1.113)	2.342 (1.195)	2.024 (1.065)
Constant	0.001+ (3.743)	0.000* (3.857)	0.039 (2.522)

Note: table reported odds ratio (Standard errors in parentheses)

*** $p < .001$ ** $p < .01$ * $p < .05$

alignment knowledge students obtained during gameplay, the higher likelihood of increase students had in spring college-going expectations. Students with one unit increase in the number of full-alignment knowledge are 4.09 times more likely to increase college-going expectations in spring compared to their counterparts, holding all other variables in the model constant.

Model 3 shows the effect of initial level of alignment knowledge in the 1st job play and number of unique job plays. Results show that students who played Init2Winit more times are more likely to increase their college-going expectations in the spring. Students with one unit increase in the number of unique job play are 3.52 times more likely to increase college-going expectations in spring compared to their peers, controlling for other covariates. We find limited benefits in the initial level of alignment knowledge in the 1st job play.

7 Discussion

Init2Winit is a mobile application created to increase low-income and minority students' awareness of and access to college knowledge and career planning. The app was tested in urban and rural high schools to determine if: (1) game play is associated with increased alignment between college, career, and earnings knowledge, and (2) alignment knowledge from game-play is associated with increased college-going expectations. Results show that on average, students who played the game during phase one increased their alignment scores and college expectations from fall to spring. Results also indicate that students with higher career alignment knowledge scores during phase two were more likely to increase college-going expectations in spring, controlling for prior college-going expectations.

Lower educational expectations have been a long-standing problem in high schools with high concentrations of low income urban and rural minority students. It is worth noting that 20% of mobile app users, nearly 39 students, did not receive any alignment points during the gameplay, indicating a lack of understanding or knowledge between career, education and income alignment in our current student sample. This means that regardless of parent, teacher, counselor, or friend input, students are still not able to adequately align their future ambitions for college or career endeavors. While research correctly compels educators to maximize these learning opportunities for students through professional development or personal experience, (West and Vosloo 2013; Mouza and Barrett-Greenly 2015), innovations like Init2Winit can prove to be another stand-alone source of information and guidance for students' agency and ownership. The autonomous learning and self-directed play of Init2Winit make it especially useful for low-income and minority students in school environments with limited access to education and career knowledge.

While promising, these results were tested with a small population. Without an actual randomized control trial study, it is not possible to account for all prior differences between users and non-users. Some other factors, such as parents' or teachers' knowledge about college preparation may affect students' participation in the Init2Winit. Second, current analyses only compare students in this study who completed both pre- and post-survey. Third, we do not have school achievement information or family socioeconomic

prior to high school which may affect students' and parents' decisions to enroll in their current high school.

8 Conclusions

High school students need a simple informational tool for college and career navigation that can be delivered easily, with a valuable reward system to motivate and sustain their interest. Init2Winit provides an accessible and enjoyable gamified platform for students to learn and explore their potential education and career goals. Efforts to increase college, career, and salary alignment through Init2Winit gameplay could galvanize and mobilize a much larger scale of students, parents, and educators towards college and career readiness than most interventions to date, due to the wide scale use, universal literacy, and access that such technology commands.

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