Agenda

Penn State World Campus Strategic Planning Process

Financial Aid Strategic Learning Project

SmarterMeasure / Starfish Analytics Predictive Analytics Research Project

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Penn State World Campus is the Online Campus of Penn State

World Campus Students (2022-23 Academic Year)

11,334 Undergraduate Students	**7,970** Graduate Students	**10,912** Resident Students (taking WC courses)	**3,705** Degrees Awarded	**More than 175** graduate degrees, undergraduate degrees, certificates, and minors

UNDERGRADUATE STUDENTS

29 Average Age	**69%** Adult Learners	**63%** Part-Time	**17%** Military Tie

GRADUATE STUDENTS

34 Average Age	**95%** Adult Learners	**93%** Part-Time	**15%** Military Tie

World Campus New Student Cohorts (2021-22 Academic Year)

2,218

Undergraduate – New WC Admits

Associate and Bachelor's students
Summer, Fall, and Spring terms

2,237

Graduate – New WC Admits

Master's and Doctoral students
Summer, Fall, and Spring terms

NEW UNDERGRADUATE ADMITS

71%
Adult Learners

60%
Part-Time

70%
Transfer/Advanced Standing

33%
First-Generation

NEW GRADUATE ADMITS

91%
Adult Learners

88%
Part-Time

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Organizational Effectiveness

Mission

Facilitate organizational effectiveness by engaging with partners and leveraging data to inform decisions, measure outcomes, and optimize strategy.

1 Team... **2** Pillars... **7** Areas of Focus.

Organizational Strategy

The **Organizational Strategy** pillar encompasses Assessment, Strategic Planning, and Change Management. Each of these specializations are unique, however, when aligned to common goals, each plays an integral role that supports the efforts of the other areas for the purposes of increasing the effectiveness of the organization.

Data Insight

The **Data Insight** pillar specializes in using analytics and technology to uncover and translate data into meaningful and actionable insight for the organization. This pillar works collectively to serve as a central source of data, knowledge, and self-service solutions to ensure other units have the right data to operate effectively.

PORTFOLIO MANAGEMENT	CHANGE MANAGEMENT	STRATEGIC PLANNING	ASSESSMENT	INSTITUTIONAL RESEARCH	DECISION SUPPORT	BUSINESS INTELLIGENCE

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Penn State World Campus Strategic Goals

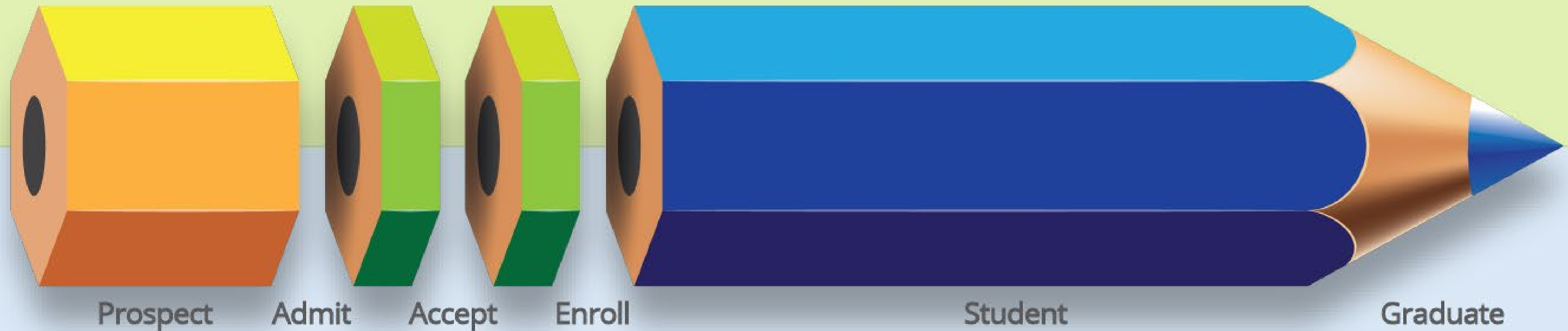**Retention**: Increase graduate graduation rates and undergraduate graduation rates

Conversion: Increase the overall conversion rate from prospect to enrolled student for undergraduate and graduate populations to help more students achieve their educational goals

Program Optimization: Increase application admits through the collaborative optimization of our program portfolio to best meet learner aspirations, satisfy market demands, and leverage academic strengths

Organization Optimization: Our resources of time, expertise, and finances are used at the highest level of effectiveness in order to decrease or redeploy effort or expense in order to sustainably support our vision of student success, including investing savings directly into student success, affordability, and success initiatives.

Foundational Focus: Inclusion, equity, and diversity are advanced in our workplaces, and with the audiences whom we support, through fostering belonging, open discourse, mutual respect, genuine care, equal opportunity, and different perspectives

Strategic Project Process

Go Live

Project Ends

Duration: 1-3 months	Duration: 2-6 weeks	Duration: 2-12 months	Duration: 2 dys - 2 wks	Duration: 2-12 months	Duration: 1-2 weeks	Duration: Ongoing
Planning	**Initiation**	**Execution**	**Verification**	**Evaluation**	**Close Out**	**Operations**
Develop business need and project proposal; submit proposal to World Campus Governance (WCG).	Project Lead, Project Manager, and Business Analyst are assigned; complete charter and submit it to WCG for approval.	Refine work breakdown and execute on project with regular project monitoring and reporting.	Execute verification plan to ensure that the solution functions as planned and that nothing else has been broken by launching the project.	Monitor the product's impact through organizational KPI dashboards to evaluate whether it is achieving the desired outcomes.	Final recommendation is made to WCG, operational plan is executed, and all final project tasks and documentation are completed.	Project is officially live in operations, as per the roles and transitions laid out in the operational plan.

Goal

A Goal is a specific achievement your Unit hopes to accomplish within the timeframe of your strategic plan. Goals should be related to your Mission and Vision, and answer the question "What do we want to accomplish?"

Objective

An Objective sets key areas of focus that must be addressed in order to achieve the goal. It answers the question, "What must do or accomplish to make progress toward our goal?"

outcome

An Outcome is a result that must occur for the objective to be realized. It answers the question, "What needs to happen in order for us to reach this objective?

action

An Action is what is done in order to meet the outcome, objective, and goal. It answers the question, "How will I achieve this outcome?

We empower learners to achieve their goals in the classroom and beyond.

Increase undergraduate graduation rate

Reduce financial barriers to degree completion

Financial awarding is increased, optimized, and targeted to align with student need and success

Determine key target populations for scholarships

Provide Development with additional information about students receiving scholarships in order to support stewardship and future fundraising

Collaborate more closely with the colleges on fundraising and joint and targeted awarding

Example

World Campus Financial Aid Strategic Learning Project

Project Team (Core Team, Advisory Group, and Consultants)

World Campus Organizational Effectiveness

Penn State Central Financial Aid Office

World Campus Financial Aid Office

World Campus Office of Admissions

Penn State Undergraduate Education (a central office that serves as a hub for a diverse range of units and programs that support undergraduate student success, including academic and financial support centers)

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Purpose

Overall Learning Project Goal: Understand the impact of financial aid-related risk factors on a student's likelihood to be retained/graduate and create recommendations for next steps
- Analyze how different forms of financial aid impact retention and graduation
- Identify changes in the composition of financial aid as a student progresses in their academic career at World Campus
- Make recommendations on the administration of financial aid, particularly gift aid and scholarships, to improve student outcomes

Three Parts to the study:
- Financial Aid Throughout the Student Lifecycle (Year 1 to Year 4)
- Year 1 Retention
- Year 1 Retained to Graduation

Variables Included in Study

Financial Aid Components:

- Cost of attendance
- FAFSA status
- Student loan amounts
- Gift aid amounts
- Low-income status
- Pell status
- Satisfactory academic progress

Demographic Components:

- Ethnicity
- Gender
- Military tie status
- First-generation status
- Admit type (first-year or advanced standing)
- Adult learner status

Academic Components:

- Terms enrolled
- Attempted course outcomes
- GPA
- Graduation status

*Data from FAFSA is not included in study

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Study Population

Study population limited to:

- Undergraduate students
- Newly admitted to World Campus from summer 2012 until fall 2018
- Total Population: 11,427

For the graduation portion of the analysis:

- Retained at Year 1 *And* had a cohort start term from Summer 2012 to Summer 2014 (2,150 students)
  - Allows each student in the population *at least* 4 years to graduate (up to 6 years depending on cohort start term)

Academic Load Classifications (Year 1)

- Full-time always (60%)
- Part-time always (24%)
- Hybrid enrollment (enrolled part-time and full-time in different semesters: 16%)

Summary of Key Findings

Part-time students who borrow student loans have higher graduation rates

Part-time students have a higher cost of attendance per credit than full-time students and take out more student loans per credit

Students with a greater number of transfer credits are more likely to graduate

Excessive borrowing (beyond the cost of tuition) is associated with lower graduation rates, particularly for part-time students with a low number of transfer credits

Students with a military tie are less likely to file a FAFSA but are more likely receive a Pell grant than students without a military tie when they do file a FAFSA

Research Methodology

Year 1 Retention
- CHAID Decision Trees
  - Year 1 Retention with all Variables
  - Year 1 Retention for Part-Time Students Only
  - Year 1 Retention for Scholarship Students Only
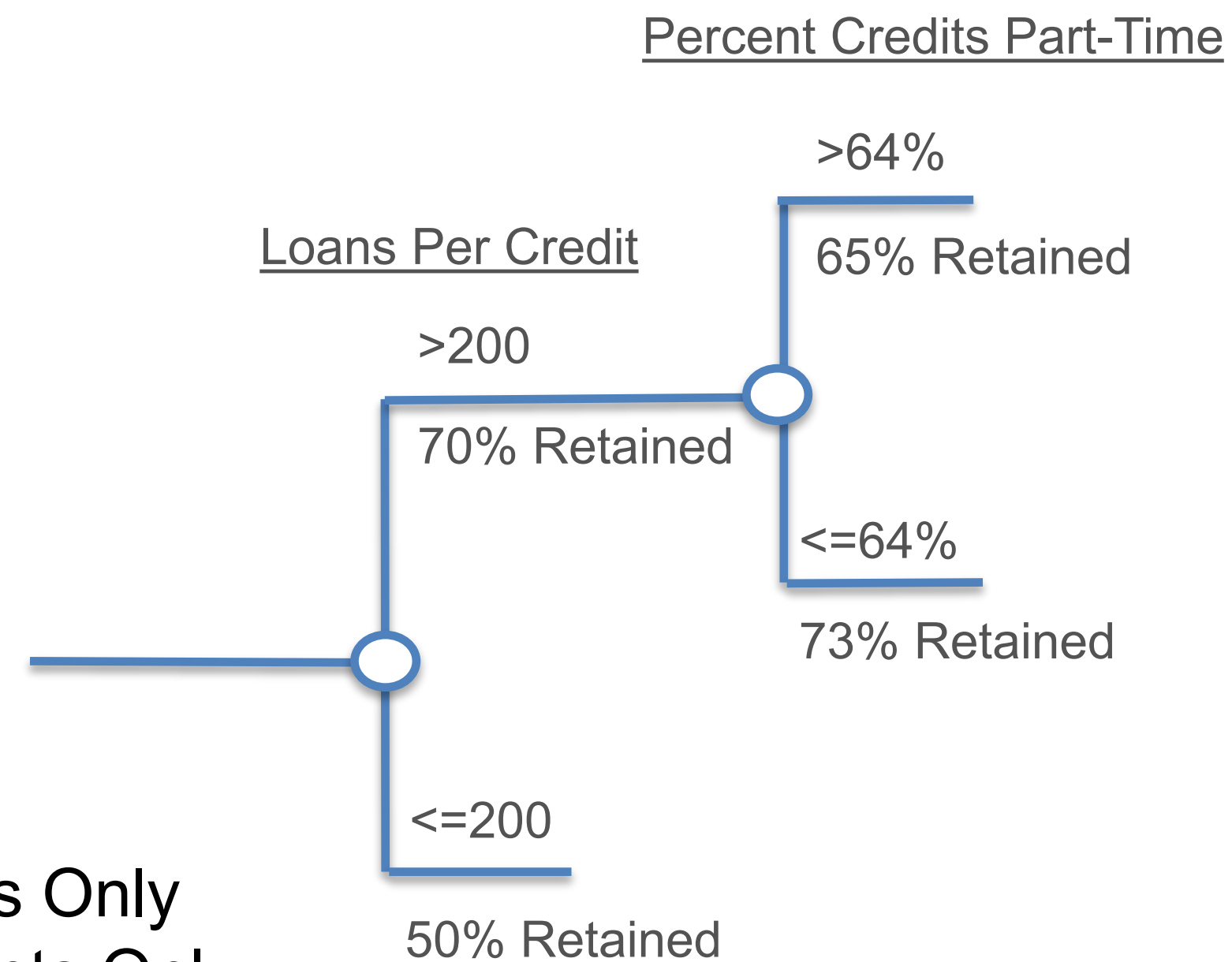
Year 1 Retained to Graduation
- CHAID Decision Trees
  - Year 1 Retained to Graduation with all Variables
  - Year 1 Retained to Graduation for Part-Time Students Only
  - Year 1 Retained to Graduation for Scholarship Students Only

Limited to students who filed a FAFSA

Intent was to find meaning through the analysis, not create the most predictive model possible
- CHAID (chi-square) decision tree model method selected because it is easier to interpret and understand than random forest models

General focus on the largest populations of students: part-time, high credit ratio

Percent Credits Part-Time

Loans Per Credit

>64%
65% Retained

>200
70% Retained

<=64%
73% Retained

<=200
50% Retained

Variables Included
Race and Ethnicity
Gender
Age
Percent Credits Part-Time
Credit Ratio
Full-time to Part-Time Flag
Need Index
Loans per Credit
Gift Aid per Credit
Scholarship per Credit
Pell Status
Low Income Status
First Gen Status
Total PLA Credits

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Students with a higher credit ratio are more likely to be retained and graduate

Credit Ratio was found to be the top predictor of student outcomes for both Year 1 Retention and Year 1 Retained to Graduation

- Credit ratio is the percentage of attempted credits successfully completed with a C or better

- Late dropped courses are included in the denominator as an unsuccessful outcome

- In prior research we have found credit ratio to be highly correlated with GPA

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Decision Tree Findings for Academically Successful, Part-Time Students (Retention)

Academically successful, part-time students **most likely to be retained** tend to have
- Medium student loans per credit
- High loans per credit and some gift aid
- Low loans per credit combined with low need index

Academically successful, part-time students **least likely to be retained** tend to have
- No student loans
- High loans per credit and no gift aid
- Low loans per credit and high need index

Decision Tree Findings for Academically Successful, Part-Time Students (Graduation)

Academically successful, part-time students **most likely to graduate** tend to
- Transfer a large number of credits, or
- Have a moderate to low number of transfer credits and **borrow a low to medium amount of student loans per credit**

Academically successful, part-time students **least likely to graduate** tend to have
- Moderate to low transfer credits **and borrow above the cost of tuition**

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Recommendations from the financial aid learning project

Enhance Financial Literacy
- **Review where students already interact with financial literacy resources**, such as New Student Orientation, to identify enhancement opportunities

Increase Pace to Degree Completion
- Consider options to **increase pace to degree completion**, possibly through **financial literacy efforts** or a **scholarship program**.

Targeted Academic and Financial Interventions
- Individually **target academic and financial interventions** based on the findings in the study.

Increase Scholarships Awarded

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Project Team (Core Team, Advisory Group, and Consultants)

Starfish Analytics (strategic analytics within Starfish student success platform)

SmarterServices (developer of SmarterMeasure online learning readiness assessment)

World Campus Organizational Effectiveness

World Campus Academic Development Services (facilitates programs and resources that promote student academic growth and success, such as new student orientation and tutoring services)

World Campus Academic Advising & Student Disability Services (a team of academic advisers who provide individualized guidance on course plans and direction to support services as appropriate to make progress on those plans)

Research Collaboration

Starfish Analytics:
- The PAR framework was a nonprofit, multi-institutional collaborative venture (funded by the Gates Foundation) focused on leveraging common data definitions and predictive analytics in the service of student success.
- Penn State World Campus implemented the PAR Framework in August 2012.
- The PAR Framework is now supported by EAB and is referred to as Starfish Analytics.

SmarterMeasure:
- SmarterMeasure Learning Readiness Indicator (SmarterMeasure) is a web-based assessment from SmarterServices which measures a learner's readiness for succeeding in an online and/or technology rich learning program based on non-cognitive indicators of success.
- Offered to incoming undergraduate students admitted to World Campus since Fall 2010 and added to New Student Orientation (NSO) in Fall 2016.
- In summer 2018, NSO became required. Although not a mandatory part of NSO, SmarterMeasure completion rates are now typically 70% or greater for each incoming cohort.

Context for Research Project

Retention Objective: Increase the number of undergraduate students retained from their first year at World Campus to their second year.
- Understand and support this student population
- Identify early indicators for retention

Data available pre-entry:
- SmarterMeasure, ALEKS Math Assessment (less than half have this pre-entry)
- Application: Demographics and Transfer GPA
- Very little high school GPA/ACT/SAT scores for adult learners

What we learned from PAR/Starfish Analytics: Academic outcomes (credit ratio, low ongoing GPA, credits earned) are the strongest predictors of retention in our post-entry student retention model

Primary Research Questions

Purpose: Evaluate the use of SmarterMeasure (SM) assessment results in combination with Starfish Analytics data to predict undergraduate student academic outcomes such as GPA and retention

1. Is the SM assessment useful for pre-entry identification of students likely to have lower first-term GPAs?

2. Which factors in the pre-entry model are most useful for identification of students likely to have lower first-term GPAs

3. Does inclusion of SM assessment results add to the predictive power of a post-entry retention model?

Study Population

Undergraduate Degree-Seeking Students starting between Summer 2018 and Summer 2019, split between

Advanced Standing Students (N=3,286)

- 18 or more transfer credits

- 3,286 of a possible 4,995 (66%) participated in Smarter Measure

First-Year Students (N=1,006)

- New to higher ed or fewer than 18 transfer credits

- 1,006 of 1,237 (81%) participated in Smarter Measure

Variables Used in Analysis

Background variables (All)
- Age at entry, first gen, gender, race, PA vs nonPA, number of transfer credits, first term attempted credits, credential sought

Background variables (Advanced Standing Only)
- Transfer cumulative GPA, number of prior institutions, age of transfer credits

SmarterMeasure variables (next slide)

Starfish model variables (All)
- Cumulative GPA, credit ratio, credits earned

Outcome variables
- Cumulative GPA as of end of student's first term
- Retention to second year (12 month retention)

Variables Used in Analysis

SmarterMeasure Subscales

Individual Attributes	Technical Knowledge	Learning Styles
Academic Attributes	Technology Usage	Visual
Help Seeking	Technology in Your Life	Physical
Locus of Control	Technology Vocabulary	Aural
Persistence	Computer/Internet Specs	Social
Procrastination		Solitary
Time Management		Verbal
		Logical

Life Factors	Technical Competency	Other Skills
Place to Study	Computer Competency	Reading Rate
Reason for Education	Internet Competency	Reading Recall
Support Resources		Typing Rate
Perception of Academic Skills		Typing Accuracy
Time to Study		

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Research Methodology

Random Forest with Partial Dependence Plots

- Enables the detection of complex patterns

- Shows the partial effect a variable has on the probability of an event, or a predicted outcome of interest within the model

Summary of Results

Are the SmarterMeasure assessment results useful for pre-entry identification of undergraduate students likely to have lower first-term GPAs? **Yes**

- First-year students: Reduces first-term GPA prediction error from 0.66 to 0.40 (about 1/4th a GPA point).

- Advanced standing students: Reduces first-term GPA prediction error from 0.53 to 0.36 (about 1/6th a GPA point).

Does adding SmarterMeasure assessment results to a post-entry model improve the performance of the model in predicting retention once first-term outcomes are known? **Marginally**

- Improves accuracy (AUC) by 0.4% (SM Scales) to 1.9% (SM Subscales).
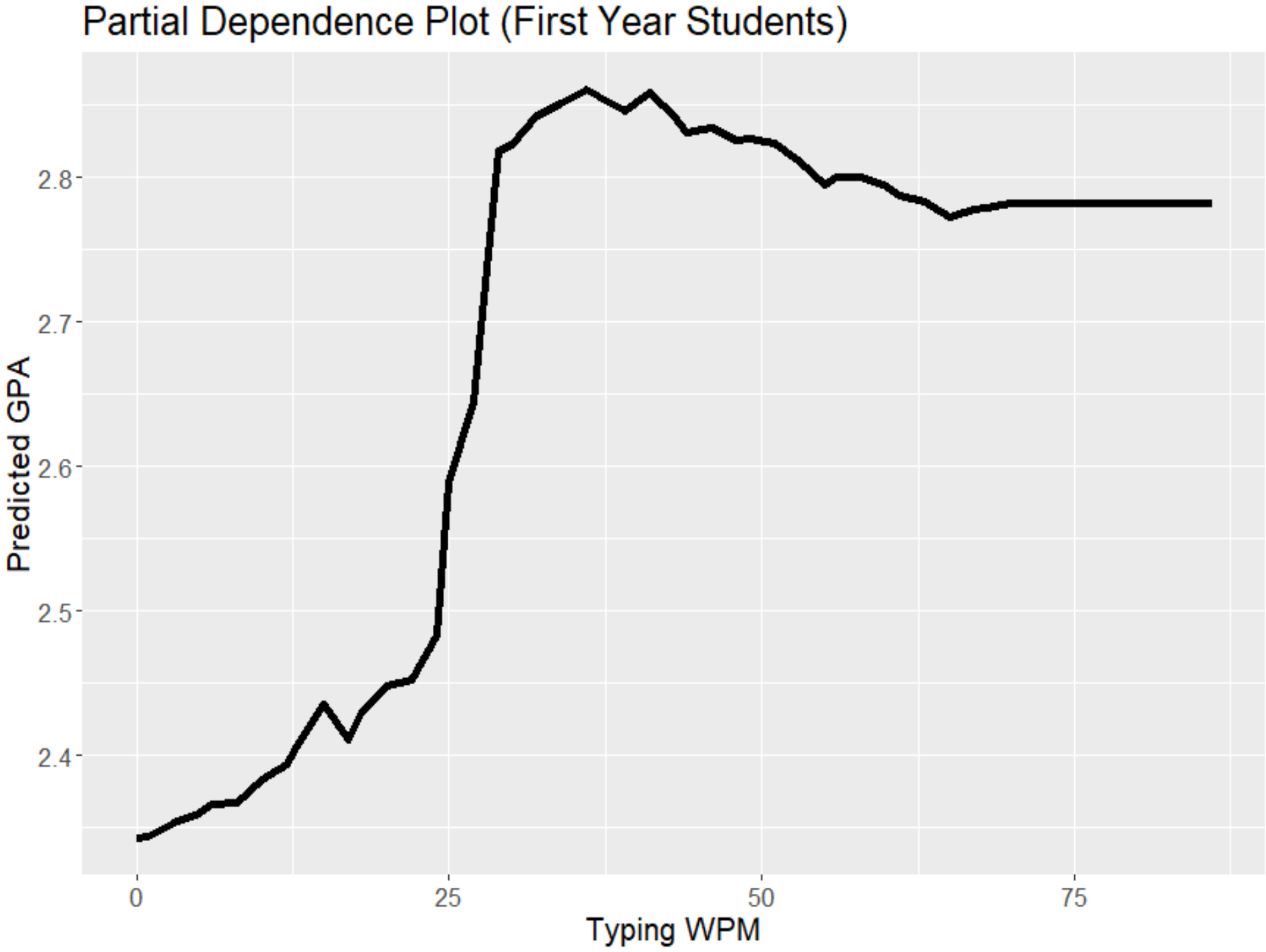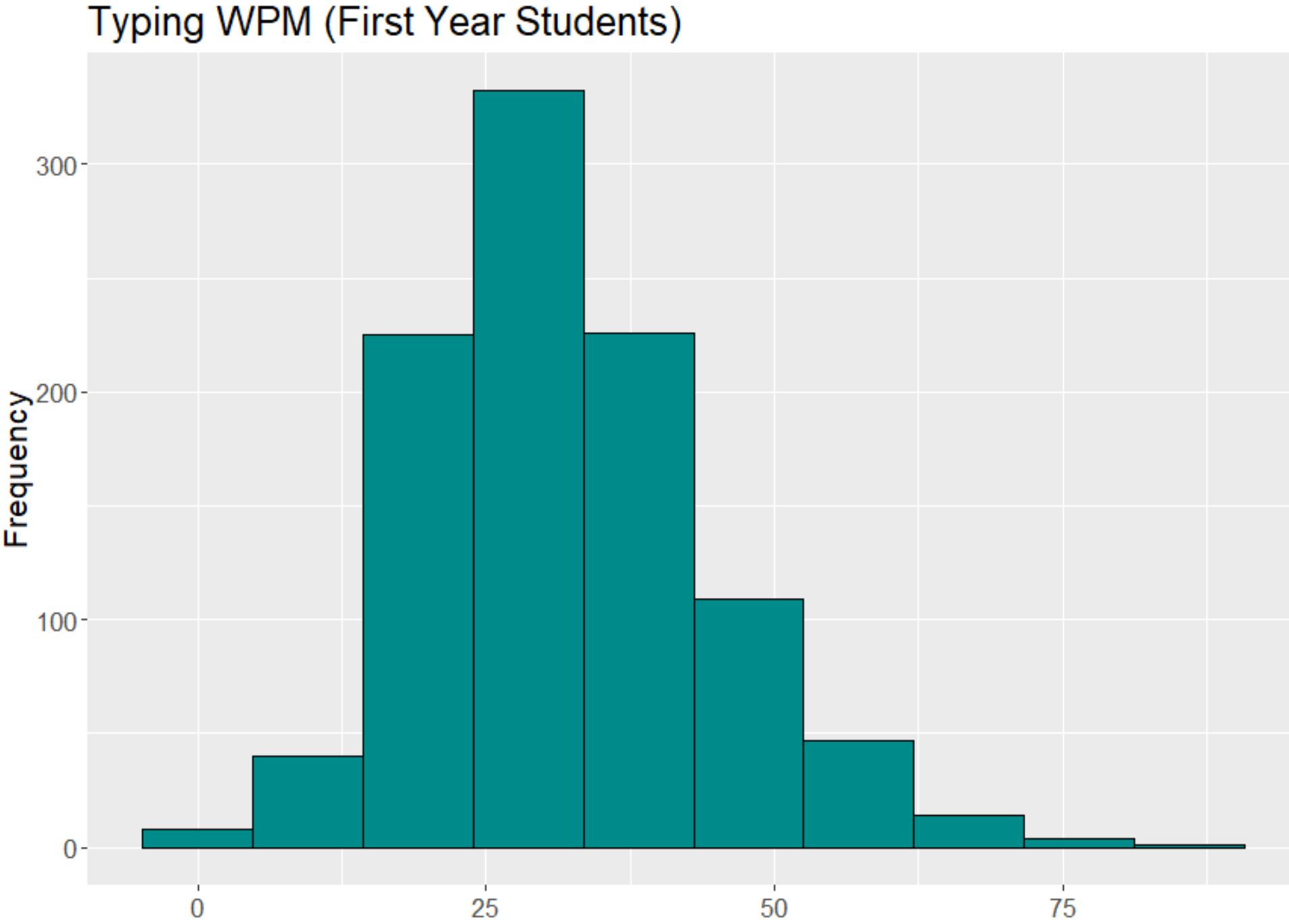
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Advanced Standing Results

Which factors available at entry are most useful for identification of students likely to have lower first-term GPAs?
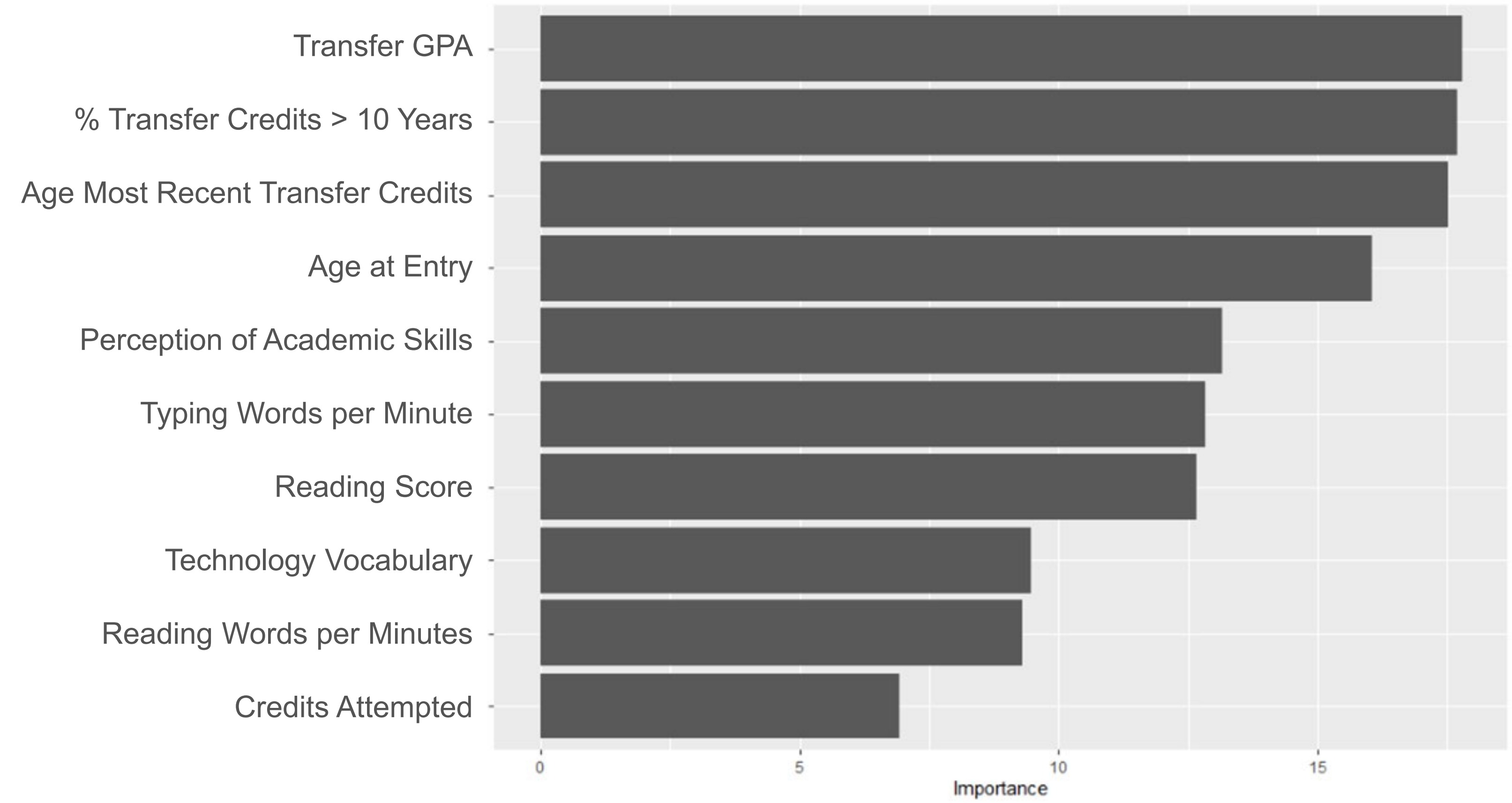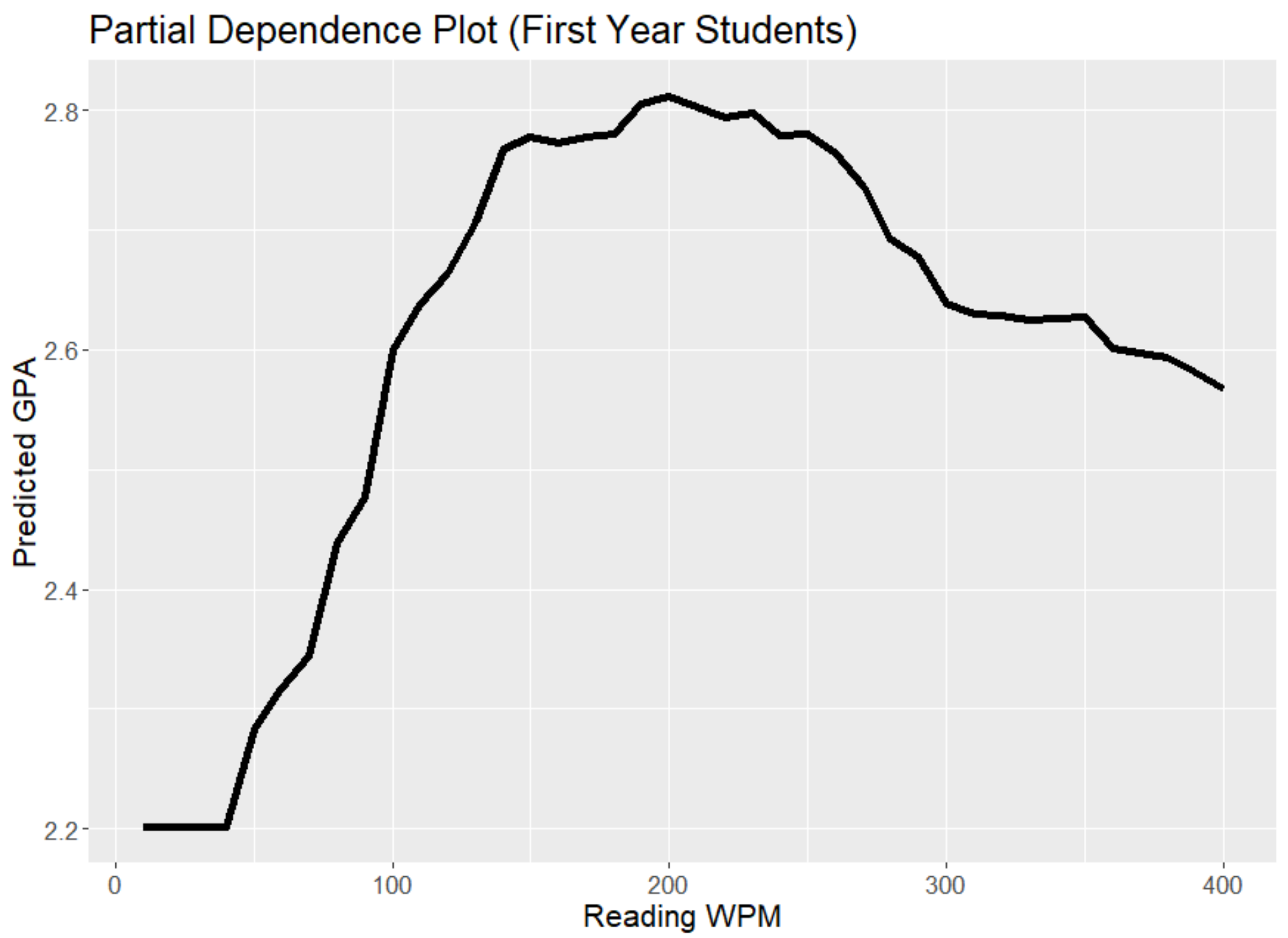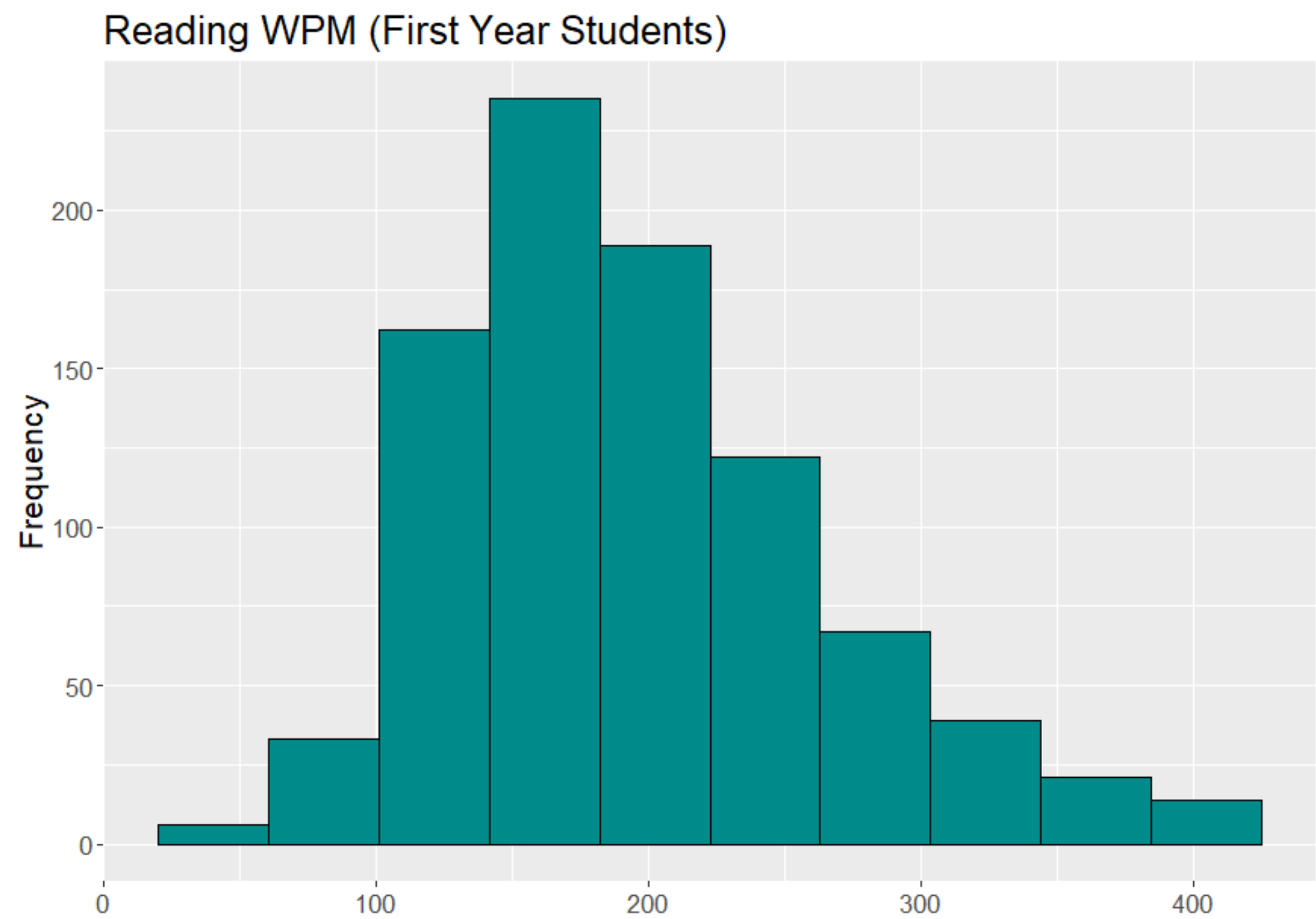
Typing Rate (Typing WPM)

First-Year Students

Predicted GPA increases sharply as Typing Rate approaches 30, then flattens

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Reading Rate (WPM)

First-Year Students

Going from low Reading Rate scores up to a Reading Rate of 200 WPM is associated with increasing predicted GPAs

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Summary of Key Findings

Data from the SmarterMeasure assessment increases Word Campus's ability to predict early academic outcomes for incoming new undergraduate students

Transfer GPA is the strongest predictor of first-term outcomes in the advanced standing model

Reading and Typing Skills were both among the top ten predictors of first-term outcomes for both advanced standing and first-year students

Perception of Academic Skills was among the top ten predictors of first-term outcomes for both advanced standing and first-year students

Recommendations from SmarterMeasure/Starfish Analytics Research Project

Targeted Remediation for Skill Deficiencies
- **Develop a self-paced Reading Strategies and Academic Skills module**
- **Develop a first-year experience course** to support under-resourced students as they navigate the unfamiliar learning environment

Increase Awareness of Relationship between Transfer GPA and First-Term Outcomes
- **Share transfer GPA** with student support units as part of existing new student reporting
- **Utilize transfer GPA to trigger an individual consultation** with Academic Development Services

Continue Using SmarterMeasure results to Support Student Success
- **Expand outreach** to incoming new students triggered by flags **based on SmarterMeasure assessment scores**

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Next Steps

We are currently providing guidance to units and committees working to implement recommendations from the strategic projects

Other Organizational Effectiveness Institutional Research Team Projects (In Progress)

Habits of Successful Students: Series of small learning projects to increase our knowledge of how habits of degree-seeking undergraduate World Campus students relate to student retention and graduation
- Credit accumulation rate
- Course registration timing

Institutional Research Knowledge Repository: Web-based interface that allows for searching and downloading historical World Campus institutional research reports with regular maintenance and updates as new reports are completed