

# How Purdue University has Benefited from the Use of UniTime and Open Source Practices

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**OPEN**  
**APEREO** **2022**

# Benefits

- Adaptability from Open Source Processes and Dialogue
- Availability of UniTime Data for Planning
- Cost Savings from Better Planning
- Ease of UniTime Integration with Other Systems
- Result: Improved Performance in the Fundamental University Mission - Educating the Students



Photo by Ryan Jacobson from Unsplash

# Adaptability

Open Source Processes Encourage Dialogue and Innovation



# Adaptability

## My Observations of Traditional Software Vendors:

- Users learn the software
- Users use the software
- Users report bugs
- Unless critical, users wait for bug fixes
- Users request additional features
- Users wait for upgrades, often years
- Users are disengaged
- Traditional software becomes stale

# Adaptability

## My Observations of Open Source:

- Users learn the software
- Users ask, “Could the software do X?”
- Open source community says, “X is a great idea, with the data from X it can do Y?”
- Users get excited and ask, “Could it do Z as well?”
- The changes are implemented quickly
- Users are engaged
- Developers are engaged
- Engagement leads to more adaptability

# Adaptability - Case Study

## Advisor Recommendation Form

Users Asked:

- Can UniTime replace the paper Student Course Requests form Advisors use to advise their students?
- Can it be saved as a PDF as proof of the advising conversation?
- Can the students access it in UniTime?

Student Course Requests		
Student's Name:		PUID:
Advisor/Email:		PIN #:
		Term:
<b>Course Requests</b>	<b>Credit Hours</b>	<b>NOTES</b>
1. Priority		
1. Alternative		
2. Alternative		
2. Priority		
1. Alternative		
2. Alternative		
3. Priority		
1. Alternative		
2. Alternative		
4. Priority		
1. Alternative		
2. Alternative		
5. Priority		
1. Alternative		
2. Alternative		
6. Priority		
1. Alternative		
2. Alternative		
7. Priority		
1. Alternative		
2. Alternative		
8. Priority		
1. Alternative		
2. Alternative		
9. Priority		
<b>Total Priority Credit Hours</b>		
<b>Substitute Course Requests</b> (used only if a course requested above is not available)		
1. Substitute		2. Substitute
Advisor's Signature _____		Date _____
Student's Signature _____		Date _____
<small>Students are responsible for meeting course prerequisites and fulfilling degree requirements, and are ultimately responsible for their own educational plan and academic success.</small>		



# Adaptability - Case Study

## Advisor Recommendation Form

**Student Course Requests**

**Student's Name:** \_\_\_\_\_ **PUID:** \_\_\_\_\_  
**Advisor/Email:** \_\_\_\_\_ **PIN #:** \_\_\_\_\_  
**Term:** \_\_\_\_\_

COURSE REQUESTS	Credit Hours	NOTES
1. Priority		
1. Alternative		
2. Alternative		
2. Priority		
1. Alternative		
2. Alternative		
3. Priority		
1. Alternative		
2. Alternative		
4. Priority		
1. Alternative		
2. Alternative		
5. Priority		
1. Alternative		
2. Alternative		
6. Priority		
1. Alternative		
2. Alternative		
7. Priority		
1. Alternative		
2. Alternative		
8. Priority		
1. Alternative		
2. Alternative		
9. Priority		
<b>Total Priority Credit Hours</b>		
<b>Substitute Course Requests</b> (used only if a course requested above is not available)		
1. Substitute	2. Substitute	
<b>Advisor's Signature</b> _____	<b>Date</b> _____	
<b>Student's Signature</b> _____	<b>Date</b> _____	

Students are responsible for meeting course prerequisites and fulfilling degree requirements, and are ultimately responsible for their own educational plan and academic success.

The student information header on the form was new, no old code to re-use.

Idea: The advisor could use the form to enable the student for registration.



# Adaptability - Case Study

## Advisor Recommendation Form

The Student Course Requests page uses similar data to paper form. Use this as a starting point.

**Student Course Requests**

Student's Name: \_\_\_\_\_ PUID: \_\_\_\_\_  
Advisor/Email: \_\_\_\_\_ PIN #: \_\_\_\_\_  
Term: \_\_\_\_\_

Course Requests	Credit Hours	NOTES
1. Priority		
1. Alternative		
2. Alternative		
2. Priority		
1. Alternative		
2. Alternative		
3. Priority		
1. Alternative		
2. Alternative		
4. Priority		
1. Alternative		
2. Alternative		
5. Priority		
1. Alternative		
2. Alternative		
6. Priority		
1. Alternative		
2. Alternative		
7. Priority		
1. Alternative		
2. Alternative		
8. Priority		
1. Alternative		
2. Alternative		
9. Priority		

Total Priority Credit Hours \_\_\_\_\_

**Substitute Course Requests** (used only if a course requested above is not available)

1. Substitute \_\_\_\_\_ 2. Substitute \_\_\_\_\_

Student's Signature \_\_\_\_\_ Date \_\_\_\_\_

Students are responsible for meeting course prerequisites and fulfilling degree requirements, and are ultimately responsible for their own educational plan and academic success.

**Student Course Requests** ?  
User: Student, Ima Test Session: Fall 2022 (PWL)  
Click here to backup a student. Click here to change the session.

**Course Requests**

1. Priority \_\_\_\_\_

1. Alternative Alternative to MA 10800

2. Priority Course with the second highest priority.

3. Priority \_\_\_\_\_

4. Priority Enter a course name, e.g., ENG 10600

5. Priority or a free time, e.g., Free MWF 7:30 - 8:30

6. Priority \_\_\_\_\_

7. Priority \_\_\_\_\_

8. Priority Course with the lowest priority.

Tip: Use Ctrl+Arrow to navigate, Ctrl+Shift+Up and Ctrl+Shift+Down to move a line around

**Substitute Course Requests** (used only if a course requested above is not available)

1. Substitute Substitute request if course(s) above not available.

2. Substitute \_\_\_\_\_

3. Substitute \_\_\_\_\_

Preferences Degree Plan Current Registration Total Credit: 1 Submit Request

# Adaptability - Case Study

## Advisor Recommendation Form

The original form doesn't show existing data for the student, advisors would likely find it useful.

**Student Course Requests**

Student's Name: \_\_\_\_\_ PUID: \_\_\_\_\_  
Advisor/Email: \_\_\_\_\_ PIN #: \_\_\_\_\_  
Term: \_\_\_\_\_

**Course Requests**

	Credit Hours	NOTES
1. Priority		
1. Alternative		
2. Alternative		
2. Priority		
1. Alternative		
2. Alternative		
3. Priority		
1. Alternative		
2. Alternative		
4. Priority		
1. Alternative		
2. Alternative		
5. Priority		
1. Alternative		
2. Alternative		
6. Priority		
1. Alternative		
2. Alternative		
7. Priority		
1. Alternative		
2. Alternative		
8. Priority		
1. Alternative		
2. Alternative		
9. Priority		

Total Priority Credit Hours \_\_\_\_\_

**Substitute Course Requests** (used only if a course requested above is not available)

1. Substitute \_\_\_\_\_ 2. Substitute \_\_\_\_\_

Advisor's Signature \_\_\_\_\_ Date \_\_\_\_\_  
Student's Signature \_\_\_\_\_ Date \_\_\_\_\_

Students are responsible for meeting course prerequisites and fulfilling degree requirements, and are ultimately responsible for their own educational plan and academic success.

Student, Ima Test

Advisor Recommendations Course Requests List of Classes Time Grid

Priority	Course	Title	Credit	Warnings	Status	Critical	Requested
1. Priority	MA 16010	Applied Calculus I	3		Submitted	✗	06/07/2022
	MA 15300	College Algebra	3		Submitted		
2. Priority	ENGL 10600	First-Year Composition	4		Submitted	✗	06/07/2022
	COM 11400	Fundament Of Speech	3		Submitted		
3. Priority	PSY 12000	Elementary Psychology	3		Submitted	✗	06/07/2022
	SOC 10000	Intro Sociology	3		Submitted		
4. Priority	EAPS 10500	The Planets	3	No alternative course provided.	Submitted	✗	06/07/2022
5. Priority	THTR 16000	Intro Scene Des/Tech	2	No alternative course provided.	Submitted	✗	06/07/2022

Requested Credit 14 - 15  
Requested Credit: 14 - 15

Advisor Recommendations Course Requests Scheduling Assistant Change Log Registration Workflow Close

7. Priority \_\_\_\_\_  
8. Priority Course with the lowest priority.

**Substitute Course Requests** (used only if a course requested above is not available)

1. Substitute Substitute request if course(s) above not available.  
2. Substitute \_\_\_\_\_  
3. Substitute \_\_\_\_\_

Preferences Degree Plan Current Registration Total Credit: 1 Submit Requests

# Adaptability - Case Study

## Advisor Recommendation Form

Proposed  
Solution  
Advisor

Advisor Course Requests

Student's Name: Student, Imogene Eugenia PUID: 13181330  
 Advisor/Email: demo@unitime.org Term: Spring 2020 (PWL) Status: Course Requests Disabled (no changes allowed)

Priority	Course	Title	Credit	Warnings	Status	Critical	Requested
1. Priority	MA 16100	PI Anly Geo Calc I	5	No alternative course provided.	Submitted		11/20/2019
2. Priority	ENGR 13200	Trans Ideas To Innovation II	2	No alternative course provided.	Submitted		11/20/2019
3. Priority	ENGL 11100	Am Lang & Culture Int II	3	No alternative course provided.	Submitted		11/20/2019
4. Priority	CNIT 18000	Intro To Systems Devel	3		Pending		11/20/2019
	CNIT 17600	Info Tech Architecture	~		Pending		
5. Priority	ME 19900	How Stuff Works	1	no alternative course provided.	Submitted		11/20/2019
Requested Credit			14		Submitted		

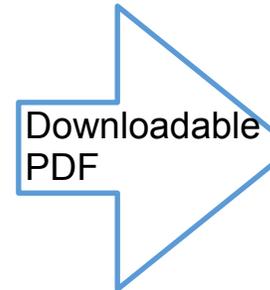
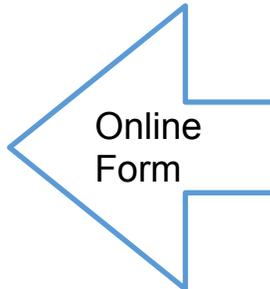
Course Requests

Priority	Course	Credit Hours	Notes
1. Priority	ENGL 11100	3	ENGL 11100 enrollment reservation
2. Priority	Course with the second highest priority.		
3. Priority			
4. Priority	Enter a course name, e.g., ENG 10600		
5. Priority	or a free time, e.g., Free MWF 7:30 - 8:30		
6. Priority			
7. Priority			
8. Priority			
9. Priority	Course with the lowest priority.		

Total Priority Credit Hours: 3

Substitute Course Requests (used only if a course requested above is not available)

1. Substitute	Substitute request if course(s) above not available.		
2. Substitute			



### Student Course Requests

Student's Name: Student, Imogene Eugenia PUID: 13181330  
 Advisor/Email: demo@unitime.org Term: Spring 2020 (PWL) Status: Course Requests Enabled This Week (Mon-Sun)

Course Requests	Credit	Notes
1. Priority <b>EDCI 20500</b> Exploring Teaching 1. Alternative <b>SCLA 10100</b> Crit Think & Com I 2. Alternative <b>ENGL 10800</b> Accel First-Yr Compos 3. Alternative <b>ENGL 10600</b> First-Year Composition 4. Alternative <b>COM 20400</b> Crit Perspectives Com 5. Alternative <b>AMST 10100</b> America And The World 6. Alternative <b>PHIL 26000</b> Philosophy And Law	3 - 4	written communication pick at least 5 courses in any order
2. Priority <b>BIOL 11000</b> Fundamentals Biol I 1. Alternative <b>BIOL 11100</b> Fundamentals Biol II 2. Alternative <b>BIOL 11200</b> Fundamental Of Biology	2 - 4	Biology fundamentals
3. Priority <b>foreign language</b>	3	Pick any foreign language Please provide an alternative, if possible
4. Priority <b>MA 26500</b> 13024-185, 13035-196, 13031-184, 13028-173, 14029-172 Linear Algebra 1. Alternative <b>MA 15300</b> College Algebra 1. Alternative <b>AAE 20300</b> Aeromechanics I 1. Alternative <b>AAE 20400</b> Aeromechanics II	3	MA 15300 if advance placement credit is not given (with an example of some class preferences)
6. Priority		some note without any course listed

Total Priority Credit Hours: 14 - 17

Substitute Course Requests (used only if a course requested above is not available)

1. Priority <b>CGT 14700</b> Visual Effects Introduction	3	some substitute to make for a complete schedule -> long note
--	---	--

Advisor's Signature: \_\_\_\_\_ Date: \_\_\_\_\_  
 Student's Signature: \_\_\_\_\_ Date: \_\_\_\_\_

Students are responsible for meeting course prerequisites and fulfilling degree requirements, and are ultimately responsible for their own educational plan and academic success.

01/16/2020 05:22PM UniTime 4.4.7, © 2008 - 2020 The Apereo Foundation, distributed under the Apache License.



# Adaptability - Case Study

## Advisor Recommendation Form

Proposed  
Solution  
Student

The screenshot shows the UNiTIME web interface. At the top, there are navigation tabs: 'Preferences', 'Degree Plan', 'Advisor Recommendations', and 'Current Registration'. The 'Advisor Recommendations' tab is highlighted with a red rectangular box. Below the tabs, the 'Course Requests' section is visible, containing two priority entries with their respective alternative courses.

Priority	Course
1. Priority	MA 16010
1. Alternative	MA 16100
2. Priority	ENGL 10600
1. Alternative	SCLA 10100

Button to  
View Form

Display Form  
In Pop-up

The screenshot shows a pop-up window titled 'Advisor Course Recommendations'. It contains a table with columns for Priority, Course, Title, Credit, and Notes. Below the table, there is a section for 'Total Priority Credit Hours' and a large block of text providing registration instructions and deadlines.

Priority	Course	Title	Credit	Notes
1. Priority	MA 16010	Applied Calculus I	3 - 5	
	MA 16100	PI Anly Geo Calc I		
2. Priority	ENGL 10600	First-Year Composition	3 - 4	
	SCLA 10100	Crit Think & Com I		
3. Priority	CHM 11100	General Chemistry	3	
	EAPS 10500	The Planets		
4. Priority	PSY 12000	Elementary Psychology	3	
5. Priority	GER 10100	German Level I	3	
1. Substitute	SOC 10000	Intro Sociology	3	

**Total Priority Credit Hours** 15 - 18

Registration Holds must be cleared: Hold removal guidance can be found here by copying and pasting the following link in your browser: <https://www.purdue.edu/registrar/currentStudents/students/holds.html>

July 13 at 5:00 PM ET - Deadline to submit your Course Request Form (CRF) - After this date you will be locked out of the system and cannot make any changes until open registration.

July 21 by 5:00 PM ET - Your schedule will be viewable in myPurdue. - You are encouraged to review at this time and anticipate any changes you wish to make during Open Registration.

July 26 - Open Registration begins. Stop. Do not make changes without the recommendation of your academic advisor.

Your time ticket for open registration changes can be found here: myPurdue>Registration Tab>Registration Status & Time Ticket.

To review how to add classes please copy and paste this link into your browser: <https://www.purdue.edu/registrar/currentStudents/students/HowToAdd.html>

To review how to drop classes please copy and paste this link into your browser: <https://www.purdue.edu/registrar/currentStudents/students/HowToDrop.html>

APIB Credit: credit will be applied in July. This may affect your schedule. Please talk to your advisor before making any changes. Dual Credit: you must send college transcripts to [admissions@purdue.edu](mailto:admissions@purdue.edu).

Please contact your Primary Academic Advisor if you have questions. All advisors will be on recess July 18-22. Advisors will respond to questions in the order they were received when they return to the office on Monday, July 25.  
PIN: 999999

# Adaptability - Case Study

## Advisor Recommendation Form

### Additional Solution Idea for Student

Pre-Populate  
Course Requests

The screenshot shows a web interface for 'Course Requests'. It features a list of six priority requests, each with an alternative course suggestion. An information popup is overlaid on the form, containing the following text: 'Your Course Requests have been pre-populated with advisor recommendations. Please review the requested courses and hit the **Submit Requests** button to finalize your pre-registration.' The popup has an 'OK' button. At the bottom of the form, there are tabs for 'Preferences', 'Degree Plan', 'Advisor Recommendations', and 'Current Registration', along with a 'Total Credit: 15 - 18' indicator and a 'Submit Requests' button. A yellow warning banner at the bottom states: 'You have made some changes in your course requests. Please click the Submit Requests button to update your submission.'

Priority	Course	Alternative
1. Priority	MA 16010	MA 16100
2. Priority	ENGL 10600	SCLA 10100
3. Priority	CHM 11100	EAPS 10500
4. Priority	PSY 12000	Alternative to PSY 12000
5. Priority	GER 10100	Alternative to GER 10100
6. Priority		

# Adaptability - Case Study

## Advisor Recommendation Form

### Less than 3 months from idea to implementation

- Project requested on December 19, 2019
- Multiple rounds of feedback
- Advisors Tested / Trained in February 2020
- In Production on March 14, 2020

# Adaptability - Case Study

## Advisor Recommendation Form

### Phenomenally High Usage Among Advisors

- COVID hit
  - Advising went online
  - The form facilitated online communication
- Advisors are engaged
  - Regularly suggest improvements
  - Suggestions are often implemented
  - Suggestions are often expanded upon
- Fall 2022 - Used for all but 50 continuing students



# Adaptability - Case Study

## Advisor Recommendation Form

Watch my Lightning Talk to see the Advisor Recommendation Form in Action:

Streamlining Student Advising - The UniTime Advisor Recommendation Form



Photo by Ryan Jacobson from Unsplash

# Data for Planning

UniTime has Useful Data for Planning



# Data for Planning - Short Term

## Curricula Data, Enrollment Data, Student Requests

This UniTime Data Helps Users Predict:

- Courses that have joint demand. — make sure these don't conflict
- Which courses are expected to have increased demand. — offer more seats
- Which courses are expected to have decreased demand. — offer fewer seats

# Data for Planning - Short Term

**Weekly Student Contact Hours, Weekly Hours of Facility Usage**

Allow UniTime to Help Users Predict:

- The types of rooms a department needs for their classes
- The number of rooms a department needs for their classes

# Data for Planning - Long Term

**Weekly Student Contact Hours, Weekly Hours of Facility Usage**

Allow UniTime to Help Users Predict:

- The types of classrooms / labs / etc. that need to be built in the future.
- The timeframe in which new classrooms / labs / etc. need to come online.
- Where on campus new classrooms / labs / etc. should be built.

# Data for Planning - Very Long Term

## Course Demand + Room Utilization in Simulations

Purdue has used UniTime to run simulations of the long term future.

- Put together its dream student body for 10 years into the future.
- UniTime projected this onto the current student body to generate course demands of this future dream student body.
- Users familiar with Purdue's programs then took their best guess at how the growth / shrinkage of demand for courses would be handled.



# Data for Planning - Very Long Term

## Course Demand + Room Utilization in Simulations

A Simulated Course Timetable was Created.

- Added course sections where determined
- Increased course section size where determined
- Shrank courses where determined
- Removed rooms in buildings slated to be torn down
- Added rooms expected to be built
- Added rooms that weren't planned but were needed to schedule all classes in the simulated timetable.
- Simulated future students were scheduled to the timetable to ensure it was a usable timetable



# Data for Planning - Very Long Term

## Course Demand + Room Utilization in Simulations

The Simulated Course Timetable was Analyzed

- Which departments would need additional staff to support their growth
- Which departments could be expected to shrink
- Whether planned rooms matched what was needed



Photo by Ryan Jacobson from Unsplash

# Cost Savings

Improved Planning leads to Cost Savings



# Cost Savings

## Purdue

Purdue benefits from cost savings thanks to better planning

- Offering the right classes, at the right capacity, at the right time
- Knowing where to focus resources in faculty hiring
- Knowing what types of spaces to build and where
- Knowing what types of spaces **not** to build

All of the above can lead to cost savings by avoiding wasteful spending on unneeded resources.



# Cost Savings

## Students

Students benefit from better planning

- Improved planning interactions with their advisors
- Able to get the courses they need to graduate on time
- Cost savings are passed on to the student



Photo by Ryan Jacobson from Unsplash

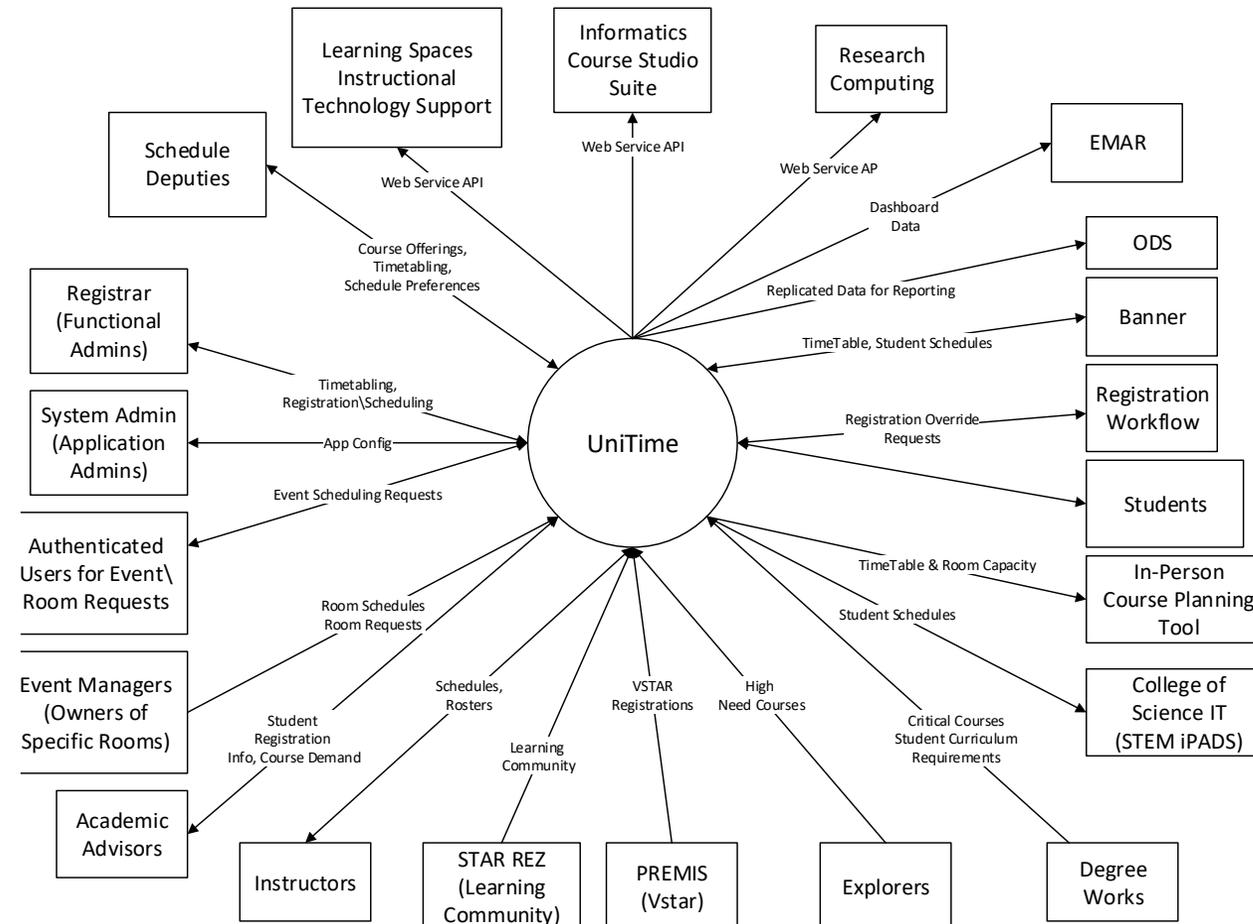
# Integration

UniTime's Open Source Foundations Allow  
for Easy Integration



# Integration

## Purdue has Integrated UniTime with Many Systems



Updated 9/30/20





Photo by Ryan Jacobson from Unsplash

# Benefit: Improved Performance

Improved Performance in the Fundamental  
University Mission of Educating the  
Students



# Benefit: Improved Performance

## Fundamental University Mission of Educating the Students

To get an education students must be able to get the courses they need.

- Improved hand off of advising information encourages student to stay on track to meet their goals.
- Improved planning allows Purdue to do a better job of meeting student needs in a more affordable manor.

# Benefit: Improved Performance

## Fundamental University Mission of Educating the Students

Additionally, UniTime is geared toward getting students the courses they need.

- UniTime provides tools to allow Purdue and other institutions to see when they are not meeting a student's needs.
- Identifying the individual students affected by poor course planning encourages better course planning.
  - Has this made Purdue perfect at meeting student needs? No, far from it.
  - Does Purdue have the tools needed to improve? **Yes!**
  - Is Purdue striving to improve? **Yes!**





Photo by Ryan Jacobson from Unsplash

# Conclusion

Open source practices have encouraged engagement with UniTime that has benefitted Purdue



# Conclusion

- Adaptability from Open Source Processes and Dialogue
- Availability of UniTime Data for Planning
- Cost Savings from Better Planning
- Ease of UniTime Integration with Other Systems
- Result: Improving Performance in the Fundamental University Mission - Educating the Students

# UniTime Resources

- Website: [www.unitime.org](http://www.unitime.org)
- Online Demo: [demo.unitime.org](http://demo.unitime.org)
- Manuals: [bit.ly/unitime46docs](http://bit.ly/unitime46docs) (or Help > Manuals in the app)
- Online Help: [help.unitime.org](http://help.unitime.org)
- Research Publications: [www.unitime.org/publications.php](http://www.unitime.org/publications.php)
- Presentations: [www.unitime.org/presentations.php](http://www.unitime.org/presentations.php)
- Webinars: [www.unitime.org/webinars.php](http://www.unitime.org/webinars.php)
- GitHub: [github.com/UniTime](https://github.com/UniTime)
- Downloads & Nightly Builds: [builds.unitime.org](http://builds.unitime.org)
- Twitter: [@UniTimeOrg](https://twitter.com/UniTimeOrg)
- Email: [team@unitime.org](mailto:team@unitime.org)

# Join the Conversation

Website: <https://www.unitime.org>

Email: [team@unitime.org](mailto:team@unitime.org)

# Thank You!

**OPEN**  
**APEREO** **2022**

Stephanie Schluttenhofer

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