Is MIDFIELD for me?

Susan Lord, Matthew Ohland, Marisa Orr, Richard Layton, and Russell Long

Contents

Chapter 1

Introduction

1.1 Objectives

MIDFIELD—as of May 1, 2021—contains individual Student Unit Record (SUR) data for 1.7 M undergraduates at 19 institutions with ABET-accredited engineering programs. Of those, 302,631 students declared engineering as a major at some point in their undergraduate education. MIDFIELD is a comprehensive resource that includes demographic, enrollment, course performance, and graduation data. A total of 33 institutions have completed Memoranda of Understanding and are expected to be included in the next release.

At the conclusion of the session, participants should be able to:

- describe MIDFIELD and the data it contains
- describe student record data
- describe some key research results that have been obtained using MID-FIELD
- determine if MIDFIELD would be useful for their research
- outline process to access MIDFIELD
- plan for future workshops if interested in learning more about MIDFIELD

1.2 Description

This special session introduces participants to the Multiple-Institution Database for Investigating Longitudinal Development (MIDFIELD). MIDFIELD includes longitudinal, whole population data for multiple institutions. This enables researchers to examine student characteristics such as race/ethnicity, sex, or age and curricular pathways,including coursework, by institution and over time. Because the data set contains records of all students matriculating over a period of time, researchers can study students in all disciplines, not just engineering.

1.3 Agenda

Min	Topic
5	Session introduction
15	Key research results usng MIDFIELD
35	Finding stories in the data
20	Resources to facilitate use of MIDFIELD
5	Wrap-up

1.4 Facilitators

Susan Lord Director of the MIDFIELD Institute and Professor and Chair of Integrated Engineering at the University of San Diego. She is a Fellow of the IEEE and the ASEE. Dr. Lord has considerable experience facilitating workshops including the National Effective Teaching Institute (NETI) and special sessions at FIE. (slord@sandiego.edu)

Matthew Ohland MIDFIELD Director and Principal Investigator. He is Professor and Associate Head of Engineering Education at Purdue University and a Fellow of IEEE, ASEE, and AAAS. Dr. Ohland has considerable experience facilitating workshops including the NETI and CATME training. (ohland@purdue.edu)

Marisa Orr MIDFIELD Associate Director and Associate Professor in Engineering and Science Education with a joint appointment in Mechanical Engineering at Clemson University. She received the 2009 Helen Plants Award for the best nontraditional session at FIE, "Enhancing Student Learning Using SCALE-UP Format." (marisak@clemson.edu)

Richard Layton MIDFIELD Data Visualization Specialist and Professor Emeritus of Mechanical Engineering at Rose-Hulman Institute of Technology. He is the lead developer of the R packages used with the MIDFIELD practice data sets. Dr. Layton has considerable experience facilitating workshops, including FIE workshops on data visualization (2014) and midfieldr (2018). (graphdoctor@gmail.com)

Russell Long MIDFIELD Managing Director and Data Steward. He developed the stratified data sample for the R packages used in this workshop. Mr. Long is a SAS expert with over twenty years of experience in institutional research and assessment. (ralong@purdue.edu)

1.5 Licenses

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1.6 Acknowledgement

top of page

Chapter 2

Explore the data

2.1 Guiding questions

Here are some guiding questions for exploring a student's academic "story"

1. What can you tell about their demographics?
2. What were their pre-college test scores?
3. When did they start?
4. What major did the student start in?
5. Did they change majors? If so, from what to what and when?
6. What courses did they do well in?
7. Did they repeat any courses?
8. Did they graduate? How long did it take them?

We will go through Case 1 together. Case 2 is provided for individual exploration after the session.

2.2 Case 1

We selected a student from the midfielddata practice data and extracted their unit records from the four MIDFIELD tables. In the first table below we decode the CIP program codes that appear in this student's record.

`cip` Link to data dictionary

decoding the CIP

cip6

cip4name

140102

Engineering, General

140801

Civil Engineering

2.2.1   Case 1 `student` record

`student` Link to data dictionary

student data for the selected student (part 1)

row

mcid

institution

transfer

hours_transfer

race

sex

1

MID25836044

Institution M

First-Time in College

NA

White

Female

student data for the selected student (part 2)

row

age

us_citizen

home_zip

high_school

sat_math

sat_verbal

act_comp

1

17

Yes

29469

411425

690

596

27

2.2.2 Case 1 `term` record

`term` Link to data dictionary

term data for the selected student (part 1)

row

mcid

institution

term

cip6

level

standing

coop

1

MID25836044

Institution M

20001

140102

01 Freshman

Good Standing

No

2

MID25836044

Institution M

20003

140102

01 Freshman

Good Standing

No

3

MID25836044

Institution M

20011

140801

02 Sophomore

Good Standing

No

4

MID25836044

Institution M

20013

140801

02 Sophomore

Good Standing

No

5

MID25836044

Institution M

20021

140801

03 Junior

Good Standing

No

6

MID25836044

Institution M

20023

140801

03 Junior

Good Standing

No

7

MID25836044

Institution M

20025

140801

04 Senior

Good Standing

No

8

MID25836044

Institution M

20031

140801

04 Senior

Good Standing

No

9

MID25836044

Institution M

20033

140801

04 Senior

Good Standing

No

term data for the selected student (part 2)

row

hours_term

hours_term_attempt

hours_cumul

hours_cumul_attempt

gpa_term

gpa_cumul

1

11

15

11

15

3.07

3.07

2

15

15

26

30

3.80

3.43

3

15

15

41

45

2.93

3.26

4

12

15

53

60

2.86

3.16

5

16

16

69

76

3.13

3.15

6

16

16

85

95

3.06

3.13

7

7

7

92

99

3.00

3.13

8

15

15

107

114

3.00

3.11

9

15

15

122

129

3.20

3.12

2.2.3 Case 1 course record

course Link to data dictionary

course data for the selected student (part 1)

row

mcid

institution

term

course

abbrev

number

1

MID25836044

Institution M

20001

MTHSC

106

2

MID25836044

Institution M

20001

SOC

201

3

MID25836044

Institution M

20001

ENGL

102

4

MID25836044

Institution M

20001

CH

101

5

MID25836044

Institution M

20001

ENGR

101

6

MID25836044

Institution M

20003

CH

102

7

MID25836044

Institution M

20003

CU

101

8

MID25836044

Institution M

20003

CP SC

120

9

MID25836044

Institution M

20003

ENGR

120

10

MID25836044

Institution M

20003

MTHSC

108

11

MID25836044

Institution M

20003

PHYS

122

12

MID25836044

Institution M

20011

C E

253

13

MID25836044

Institution M

20011

E M

201

14

MID25836044

Institution M

20011

MTHSC

206

15

MID25836044

Institution M

20011

C E

251

16

MID25836044

Institution M

20011

C E

255

17

MID25836044

Institution M

20013

E M

202

18

MID25836044

Institution M

20013

E M

201

19

MID25836044

Institution M

20013

E G

209

20

MID25836044

Institution M

20013

A A H

210

21

MID25836044

Institution M

20013

PHYS

221

22

MID25836044

Institution M

20013

MTHSC

208

23

MID25836044

Institution M

20021

ECON

211

24

MID25836044

Institution M

20021

EX ST

301

25

MID25836044

Institution M

20021

ENGL

314

26

MID25836044

Institution M

20021

C E

351

27

MID25836044

Institution M

20021

C E

200

28

MID25836044

Institution M

20023

C E

331

29

MID25836044

Institution M

20023

C E

352

30

MID25836044

Institution M

20023

C E

353

31

MID25836044

Institution M

20023

C E

311

32

MID25836044

Institution M

20023

C E

341

33

MID25836044

Institution M

20023

C E

301

34

MID25836044

Institution M

20025

SPCH

250

35

MID25836044

Institution M

20025

C E

321

36

MID25836044

Institution M

20031

ECON

212

37

MID25836044

Institution M

20031

EE&S

401

38

MID25836044

Institution M

20031

C E

421

39

MID25836044

Institution M

20031

C E

406

40

MID25836044

Institution M

20031

C E

342

41

MID25836044

Institution M

20033

C E

433

42

MID25836044

Institution M

20033

C E

402

43

MID25836044

Institution M

20033

C E

459

44

MID25836044

Institution M

20033

SOC

310

45

MID25836044

Institution M

20033

ENGL

206

course data for the selected student (part 2)

row

section

type

faculty_rank

hours_course

pass_fail

grade

1

007

Duplicate Credit

4

No

B

2

006

Lecture

3

No

B

3

004

Lecture

3

No

B

4

006

Lecture

4

No

B

5

005

Lecture

1

No

A

6

Lecture

4

No

CR

7

001

Lecture

2

No

A

8

007

Lecture

3

No

A

9

003

Lecture

3

No

B

10

001

Lecture

4

No

A

11

001

Lecture

3

No

A

12

002

Lecture

2

No

A

13

003

Lecture

3

No

D

14

011

Lecture

4

No

B

15

001

Lecture

3

No

A

16

001

Lecture

3

No

B

17

Lecture

3

No

CR

18

004

Duplicate Credit

3

No

B

19

002

Lecture

2

No

C

20

002

Lecture

3

No

B

21

001

Lecture

3

No

B

22

002

Lecture

4

No

B

23

027

Lecture

3

No

B

24

003

Lecture

3

No

A

25

018

Lecture

3

No

A

26

001

Lecture

3

No

B

27

001

Lecture

4

No

C

28

001

Lecture

3

No

C

29

001

Lecture

2

No

B

30

001

Lecture

1

No

A

31

001

Lecture

3

No

A

32

001

Lecture

4

No

B

33

001

Lecture

3

No

B

34

157

Lecture

3

No

B

35

001

Lecture

4

No

B

36

004

Lecture

3

No

B

37

001

Lecture

3

No

B

38

001

Lecture

3

No

A

39

001

Lecture

3

No

C

40

001

Lecture

3

No

B

41

001

Lecture

3

No

B

42

001

Lecture

3

No

B

43

001

Lecture

3

No

A

44

002

Lecture

3

No

B

45

009

Lecture

3

No

B

2.2.4   Case 1 `degree` record

`degree` Link to data dictionary

degree data for the selected student

row

mcid

institution

term

cip6

degree

1

MID25836044

Institution M

20033

140801

Bachelor of Science

2.3   Case 2

We selected a second student from the midfielddata practice data and extracted their unit records from the four MIDFIELD tables. In the first table below we decode the CIP program codes that appear in this student's record.

`cip` Link to data dictionary

decoding the CIP

cip6

cip4name

140701

Chemical Engineering

141001

Electrical, Electronics and Communications Engineering

2.3.1   Case 2 student record

`student` Link to data dictionary

student data for the selected student (part 1)

row

mcid

institution

transfer

hours_transfer

race

sex

age

1

MID26035311

Institution C

First-Time in College

1

Hispanic/Latinx

Male

18

student data for the selected student (part 2)

row

us_citizen

home_zip

high_school

sat_math

sat_verbal

act_comp

1

Yes

80521

HC0602

NA

NA

22

2.3.2 Case 2 `term` record

`term` Link to data dictionary

term data for the selected student (part 1)

row

mcid

institution

term

cip6

level

standing

coop

1

MID26035311

Institution C

20041

140701

01 Freshman

Good Standing

No

2

MID26035311

Institution C

20043

140701

01 Freshman

Good Standing

No

3

MID26035311

Institution C

20051

140701

02 Sophomore

Good Standing

No

4

MID26035311

Institution C

20053

141001

02 Sophomore

Good Standing

No

5

MID26035311

Institution C

20054

141001

03 Junior

Good Standing

No

6

MID26035311

Institution C

20061

141001

03 Junior

Good Standing

No

7

MID26035311

Institution C

20063

141001

03 Junior

Good Standing

No

8

MID26035311

Institution C

20071

141001

04 Senior

Good Standing

No

9

MID26035311

Institution C

20074

141001

04 Senior

Good Standing

No

term data for the selected student (part 2)

row

	hours_term	hours_term_attempt	hours_cumul	hours_cumul_attempt	gpa_term	gpa_cumul
1	11	11	11	11	2.76	2.80
2	14	14	25	25	2.07	2.40
3	15	15	40	40	2.31	2.40
4	15	15	55			

55

2.41

2.36

5

7

7

62

62

2.87

2.52

6

14

14

76

76

2.48

2.51

7

13

16

89

92

2.21

2.45

8

14

14

103

106

3.00

2.62

9

9

9

112

128

3.56

2.77

2.3.3 Case 2 `course` record

`course` Link to data dictionary

course data for the selected student (part 1)

row

mcid

institution

term

course

abbrev

number

1

MID26035311

Institution C

20041

Physics-Scientists&Engineers I

PHCC

141

2

MID26035311

Institution C

20041

College Algebra I

M

CC1

3

MID26035311

Institution C

20041

General Chemistry Laboratory I

C

CC1

4

MID26035311

Institution C

20041

Strategies of Engineerng Desgn

CH

192

5

MID26035311

Institution C

20041

College Algebra II

M

CC1

6

MID26035311

Institution C

20041

General Chemistry I

C

CC1

7

MID26035311

Institution C

20041

College Composition

COCC

150

8

MID26035311

Institution C

20043

Aerospace Group Study I

AS

196

9

MID26035311

Institution C

20043

Foundations of Air Force II

AS

102

10

MID26035311

Institution C

20043

Java Programming

CSCC

153

11

MID26035311

Institution C

20043

Calculus-Physicl Scientists II

M

CC1

12

MID26035311

Institution C

20043

Digital Circuit Logic

EE

102

13

MID26035311

Institution C

20043

Physics-Scientists&Engineers I

PHCC

141

14

MID26035311

Institution C

20051

Electrical Engr Fundamentals

EE

192

15

MID26035311

Institution C

20051

Physics-Scientist&Engineers II

PHCC

142

16

MID26035311

Institution C

20051

Calculus-Physicl Scientst III

M

261

17

MID26035311

Institution C

20051

U.S. History to 1876

HYCC

150

18

MID26035311

Institution C

20053

Public Speaking

SPCC

200

19

MID26035311

Institution C

20053

Circuit Theory Applications

EE

202

20

MID26035311

Institution C

20053

Digital Circuit Logic

EE

102

21

MID26035311

Institution C

20053

Intro-Ordinary Differen Equatn

M

340

22

MID26035311

Institution C

20054

Statistics-Engrs & Scientists

STCC

309

23

MID26035311

Institution C

20054

Calculus-Physicl Scientst III

M

261

24

MID26035311

Institution C

20061

Introduction-Microprocessors

EE

251

25

MID26035311

Institution C

20061

Electromgntc Fields&Devices I

EE

341

26

MID26035311

Institution C

20061

Linear System Analysis I

EE

311

27

MID26035311

Institution C

20061

Electronics Principles I

EE

331

28

MID26035311

Institution C

20063

Linear System Analysis II

EE

312

29

MID26035311

Institution C

20063

Psychology of Human Sexuality

PYCC

228

30

MID26035311

Institution C

20063

Music Theory Fundamentals

MUCC

111

31

MID26035311

Institution C

20063

Electronics Principles II

EE

332

32

MID26035311

Institution C

20063

Electromgntc Fields&Devices II

EE

342

33

MID26035311

Institution C

20071

Digital System Design

ECE

451

34

MID26035311

Institution C

20071

Senior Design Project I

ECE

401

35

MID26035311

Institution C

20071

Digital System Design Lab

ECE

450

36

MID26035311

Institution C

20071

Control Systems

ECE

411

37

MID26035311

Institution C

20071

Semiconductor Devices

ECE

471

38

MID26035311

Institution C

20073

Senior Design Project II

ECE

402

39

MID26035311

Institution C

20073

Intro to C Programming I

CS

156

40

MID26035311

Institution C

20073

Introduction to Unix

CS

155

41

MID26035311

Institution C

20073

Digital Contrl&Digital Filters

ECE

412

42

MID26035311

Institution C

20073

Analog Integrated Circuit Lab

ECE

535

43

MID26035311

Institution C

20073

Analog Integr Circuit Design

ECE

534

44

MID26035311

Institution C

20073

Intro to C Programming II

CS

157

45

MID26035311

Institution C

20073

Computer Networks

ECE

456

46

MID26035311

Institution C

20074

Current World Problems

POLS

131

47

MID26035311

Institution C

20074

Independent Study

ECE

495

48

MID26035311

Institution C

20074

Introduction-Thermal Sciences

MECH

237

49

MID26035311

Institution C

20074

Principles of Microeconomics

ECON

202

course data for the selected student (part 2)

row

section

type

faculty_rank

hours_course

pass_fail

grade

1

001

Associate Professor

5

2

550

1

S

3

L04

Graduate Assistant

1

B

4

L01

Instructor

3

B-

5

550

1

S

6

002

Professor

4

C+

7

084

Instructor

3

B+

8

001

1

S

9

001

1

B

10

001

Instructor

4

C

11

004

Graduate Assistant

4

C

12

001

Instructor

4

13

001

Professor

5

C

14

001

Professor

3

C-

15

001

Professor

5

B+

16

001

Graduate Assistant

4

D

17

002

Assistant Professor

3

B

18

016

3

B-

19

001

4

C

20

001

Instructor

4

B-

21

003

Professor

4

C+

22

001

Graduate Assistant

3

B-

23

001

Graduate Assistant

4

B

24

001

Instructor

4

C+

25

001

Professor

3

C

26

001

Assistant Professor

3

B+

27

001

Instructor

4

C+

28

001

Instructor

3

C+

29

001

Professor

3

F

30

002

Graduate Assistant

3

B

31

001

Associate Professor

4

B+

32

001

Professor

3

C

33

001

Instructor

3

B-

34

L01

Instructor

3

A-

35

L02

Instructor

1

B-

36

001

Associate Professor

4

B

37

001

Professor

3

B-

38

L01

Instructor

3

A-

39

001

1

A

40

001

1

B

41

001

Associate Professor

3

B

42

L01

1

B+

43

001

3

B+

44

001

1

A

45

001

Professor

4

W

46

001

Instructor

3

A

47

001

Professor

2

I

48

001

Graduate Assistant

3

B-

49

001

Associate Professor

3

A

2.3.4   Case 2 `degree` record

`degree` Link to data dictionary

degree data for the selected student

row

mcid

institution

term

cip6

degree

1

MID26035311

Institution C

20084

141001

Bachelor of Science

top of page