Introduction:

The College of New Jersey's Integrative STEM Education Department produces highly skilled teaching professionals in the Science, Technology, Engineering & Mathematics (STEM) fields in the full PreK–12 spectrum at both the undergraduate and graduate levels. The department's teacher preparation programs, all centering on design pedagogies (via technology & engineering methods), are national models in STEM teacher preparation, as recognized by several national organizations including the National Academy of Engineering (NAE), American Society for Engineering Education (ASEE), and the International Technology and Engineering Educators Association (ITEEA).

The department coordinates two undergraduate majors and one graduate program that prepare students to become Pre K-12 teachers: 1) the Technology & Engineering Education (TEE) major, 2) the Integrative STEM Education (2nd Major) and 3) the Master in Education degree program in Integrative STEM Education.

This CAEP report addresses the progression of the teacher candidates in the Technology & Engineering Education major for three years (2017 - 2018, 2018 - 2019, 2019 - 2020). During this time period, the TEE program graduated 20 teacher candidates. This is a small number relative to past time periods so the overall summaries will be addressed in the aggregate. At the same time, close inspection of the cohorts year by year was necessary in certain parts of the report as we made an effort to understand the effects of the implementation of EdTPA and the rapid college wide transition to remote learning due to the SARS-CoV-2 pandemic. The department chose to use 6 assessments that track the progressions of the TEE teacher candidates according to the InTASC and CAEP standards.

Assessment 1: Praxis Content Assessment for Teaching,
Assessment 2: EdTPA Assessment,
Assessment 3: Safety Assessment for Technology & Engineering Educators in ETE275 Mechanics & Materials Lab,
Assessment 4: Unit and Lesson Plan Assessment in TED380 Junior Professional Experience (Clinical I),
Assessment 5: Professional Disposition Assessment in TED490 Student Teaching Experience (Clinical II), and
Assessment 6: Teaching Performance Assessment in TED490 Student Teaching Experience (Clinical II)

These assessments begin during the teaching candidate's sophomore year and continue through Clinical I and Clinical II during the junior and senior years, respectively. Figure 1 shows the timeline of all 6 assessments. Assessments 3, 4, 5, and 6 were previously developed by department faculty and were aligned to the ITEA-CTTE 2003 NCATE standards. For this report, we have aligned the program standards to CAEP and the InTASC standards (Table 1). In addition, the safety assessment is given to both TEE and

iSTEM majors who take ETE275: Mechanics & Materials Lab, which gives us a good indication of how our program is evaluating teacher training on the proper use of tools and equipment of a woods shop.

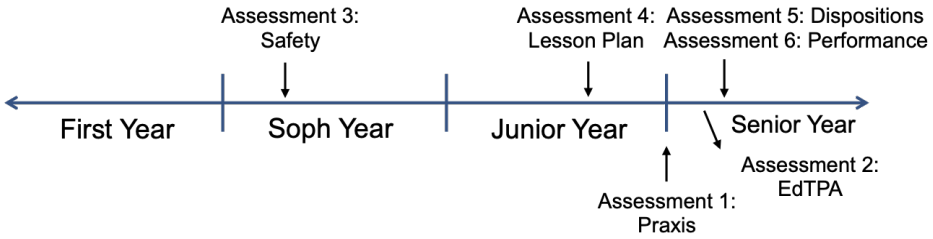

Figure 1: Timeline of administration of TEE program assessments with respect to the teacher candidates' progression.

Table 1: Alignment of ITEA-CTTE 2003 Technology Standards with InTASC Principles (2013) and CAEP Standards

Standards	Learner Development	Learning Differences	Diverse Learning Environments	Content Knowledge	Application of Content Knowledge	Assessment	Planning for Instruction	Implements Instructional Strategies	Professional Responsibilities & Leadership	Ethical Practice
New Jersey Teaching Standards (2014)	**1 Learner Development** Recognizing how patterns of learning and development vary individually; designing and implementing appropriate learning experiences	**2 Learning Difference** Providing inclusive learning environments that enable each learner to meet high Standards. Understanding individual differences in a broader context, including attention to a learner's personal, family, and community experiences and cultural norms	**3 Learning Environments** Collaboration with learners, families, and colleagues Demonstrating respect for cultural backgrounds and differing perspectives that learners bring to the learning environment	**4 Content Knowledge** Creating learning experiences to make content accessible and meaningful for Students.	**5 Application of Content**	**6 Assessment** Uses of assessment data to engage learners in examining growth and to guide teacher and learner decision-making about learning needs	**7 Planning for Instruction** Planning in use of assessment data and students' prior knowledge and interest.	**8 Instructional Strategies** Collaborative planning among teachers and with learners to support design of relevant learning experiences	**9 Professional Learning** Professional learning aligned with a teacher's needs as a growing professional, using feedback from evaluations, data on learner performance, and school-wide and district-wide priorities	**10 Leadership and Collaboration 11 Ethical Practice** Use of various communication strategies and technological tools to build local, and global learning communities that engage learners, families and colleagues. Collaboration with other school professionals to plan and facilitate learning.
InTASC Principles (2013)	**1 Learner Development** The teacher understands how learners grow and develop, recognizing that patterns of learning and development vary individually within and across the cognitive, linguistic, social, emotional, and physical areas, and designs and implements developmentally appropriate and challenging learning experiences.	**2 Learning Differences** The teacher uses understanding of individual differences and diverse cultures and communities to ensure inclusive learning environments that enable each learner to meet high standards.	**3 Learning Environments** The teacher works with others to create environments that support individual and collaborative learning, and that encourage positive social interaction, active engagement in learning, and self- motivation	**4 Content Knowledge** The teacher understands the central concepts, tool of inquiry, and structures of the discipline(s) he or she teaches and Creates learning experiences that make the discipline accessible and meaningful for learners to assure mastery of the content.	**5 Application of Content** The teacher understands how to connect concepts and use differing perspectives to engage learners in critical thinking, creativity, and collaborative problem solving related to authentic local and global issues.	**6 Assessment** The teacher understands and uses multiple methods of assessment to engage learners in their own growth, to monitor learner progress, and to guide the teacher's and learner's decision making.	**7 Planning for Instruction** The teacher plans instruction that supports every student in meeting rigorous learning goals by drawing upon knowledge of content areas, curriculum, cross-disciplinary skills, and pedagogy, as well as knowledge of learners and the community context.	**8 Instructional Strategies** The teacher understands and uses a variety of instructional strategies to encourage learners to develop deep understanding of content areas and their connections, and to build skills to apply knowledge in meaningful ways.	**9 Professional Learning and Ethical Practice** The teacher engages in ongoing professional learning and uses evidence to continually evaluate his/her practice, particularly the effects of his/her choices and actions on others (Learners, families, other professionals, and the community), and adapts practice to meet the needs of each learner.	**10 Leadership and Collaboration** The teacher seeks appropriate leadership roles and opportunities to take responsibility for students learning, to collaborate with learners, families, colleagues, other school professionals, and community members to ensure learner growth, and to advance the profession.
CAEP Standards	1.1, 1.2, 1.3,	1.1, 1.2, 1.3, Standard 3: 3,1, 3.3, 3.4, 3.5 Standard 4 (all four elements)	Standard 1 (all elements) Standard 3, 3.3, 3.4	All elements in Standard 1 and Standard 3	1.1., 1.2, 1.3, 1.4, 1.5, Standard 4: 4.1, 4.2, Standard 5 (all five elements)	1.1., 1.2, 1.3, 1.4, 1.5, Standard 4: 4.1, 4.2, Standard 5 (all five elements)	All elements in Standard 1 and Standard 2	All elements in Standard 1 and Standard 5 Standard 4: 4.1, 4.2,	All elements for Standard 2, Standard 4, and Standard 5	All elements for Standards 2, 4, and 5
ITEA-CTTE - 2003 (Technology Standards)	6k, 9d	6d, 9k, 9p, 7k	8k, 8p, 8d	1k, 1p, 2k, 2p, 3k 3p, 4k, 4p, 5k, 5p, 7p	1d, 2d, 3d, 4d, 5d, 6k	4k, 4p, 7k, 7p	1p, 2p, 3p, 4p, 5p, 6k, 6d, 6p	7k, 7d, 7p	10k, 10d, 10p	Leadership: 10k, 10d, 10p Ethics: 2k, 2d, 2p, 3p, 4p

Assessment 1: Praxis Content Assessment for Teaching

Praxis Exam Description:

The Praxis Technology Education (test code #5051) Exam is taken by junior students in the Technology & Engineering Education major before their Clinical II experience. Integrative STEM Education students who are seeking certification as a middle school or high school technology education teacher also take the exam before graduation. The examination assesses teacher candidate content knowledge related to "essential concepts from the Technology Literacy Standards prepared by the International Technology and Engineering Educators Association (ITEEA)" as well as material pertinent to the International Society for Technology Standards for Teachers (ISTE Standards T). According to the Praxis Study Companion, the 120 questions span 6 content categories including 1) Technology and Society, 2) Technological Design and Problem Solving, 3) Energy, Power, and Transportation, 4) Information and Communication Technologies, 5) Manufacturing and Construction Technologies, and 6) Pedagogical and Professional Studies. Table 1.1 shows the number and percentage of questions by content categories (Praxis Study Companion).

Table 1.1: Content areas of Praxis II Technology Education (5051)

Content Categories	Approximate Number of Questions	Approximate Percentage of Examination
I. Technology and Society	18	15%
II. Technological Design and Problem Solving	24	20%
III. Energy, Power, and Transportation	18	15%
IV. Information and Communication Technologies	18	15%
V. Manufacturing & Construction Technologies	18	15%
VI. Pedagogical & Professional Studies	24	20%

Content Validity and Inter-rater Reliability Scores for EPP Created Assessments

[Linda will add this section later.]

Report Data Tables

Table 1.2 presents Technology Education Praxis (5051) score data for TCNJ students majoring in Technology and Engineering Education from years 2017 through 2019. Only one student in the three year cohort scored below the passing score. In general, teacher candidates score well above the NJ passing score of 159 (Figure 1.1). The program mean and program median have always been within the national range 170 -189.

Table 1.2. Teacher candidate 2017-2019 score data compared to the national median and range.

Year	N	Program Mean*	Program Median	Program Range	Candidate Pass Rate	National Median†	National Range†
2017	8	181	180	168 - 197	100%	181	170 - 189
2018	6	175	176	154 - 191	83%	181	170 - 189
2019	6	178	179	162 - 186	100%	181	170 - 189
2017–2019	**20**	**178**	**179**	**154 - 197**	**95%**	**181**	**170 - 189**

** State passing score for 2017–2019 was 159.*
† "Median and Average Performance Range‡ were calculated from the records of test takers who took the test between August 2016 and July 2019. If a test taker took the test more than once in this period, the most recent score was used." (ETS)
‡ "Average Performance Range – The range of scaled scores earned by the middle 50 percent of the test takers taking the test. It provides an indication of the difficulty of the test." (ETS)

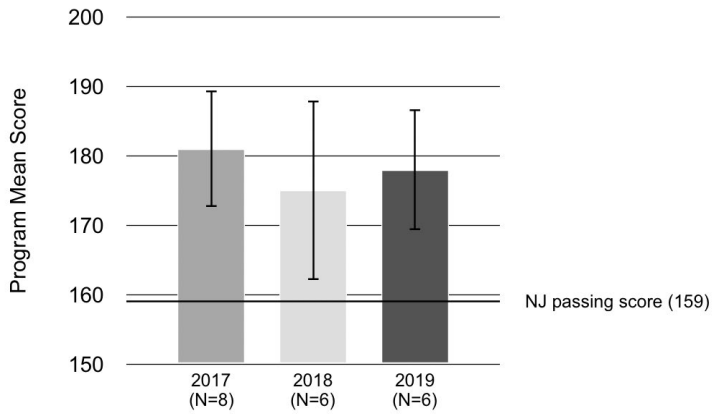

Figure 1.1. Teacher candidates' mean Praxis scores (5051) across three years (2017 - 2019). Error bars represent one standard deviation.

Table 1.3 and Figure 1.2 present student performance in each of the six content areas. Score averages are reported as percentages because "points possible" in each content are varied. For example, the points possible for the Technology and Society content area were either 16 or 17 points in 2017.

Table 1.3. Teacher candidate 2017-2019 performance in each Technology Education content area.

Year	N	Technology and Society	Technological Design and Problem Solving	Energy, Power, and Transportation	Information and Communication Technologies	Manufacturing and Construction Technologies	Pedagogical and Professional Studies
2017	8	80%	78%	67%	79%	72%	81%
2018	6	68%	74%	68%	72%	68%	73%
2019	6	74%	79%	67%	64%	72%	77%
2017–2019	**20**	**75%**	**77%**	**67%**	**72%**	**71%**	**77%**

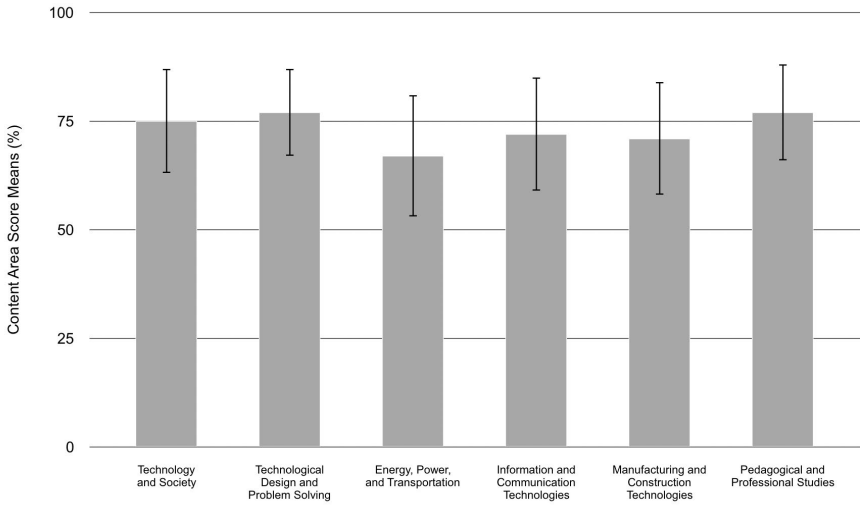

Figure 1.2. Technology Education Praxis content area score means (2017–2019) for Technology and Engineering Education students at The College of New Jersey. Error bars represent one standard deviation.

Brief Analysis of Data Findings

As shown in Table 1.2 and Figure 1.1, Technology and Engineering Education majors at The College of New Jersey have consistently demonstrated strong performance on the Technology Education Praxis, with scores well above the state passing score of 159 and a three year passing rate of 95%. There is little variation in program mean scores, with a three year mean score of 178.

As shown in Table 1.3 and Figure 1.2, content area scores indicate that students are proficient in each of the six areas tested by the completion of their junior year. In five out of the six areas, students achieved a mean score higher than 70%. The only area in which students achieved a lower score was Energy, Power, and Transportation (67%). Concepts from the areas of energy and power are covered in department courses ETE281: Analog Electronics, ETE381: Digital Electronics, and ETE341: Biotechnology and Environmental Systems. While the program does not have a designated course to teach Transportation Systems, the domain is woven into the curriculum. In contrast, our program offers a specific course that covers content from standards related to biotechnology, medical, and agricultural technology which are *not assessed* in the national Praxis exam. It should be noted that the program sequence still requires teacher candidates to take three content courses during their senior year so conceivably students could perform higher if they took the exam during their senior year.

Interpretation of How Data Provided Evidence for Candidates Meeting Standards

The praxis assessment relates specifically to InTASC standard #4: Content Knowledge. In particular it covers the essential knowledge of major concepts as outlined by the Standards of Technological Literacy developed by the International Technology and Engineering Educators Association (ITEEA).

We also want to acknowledge the Technology Education field is going through another change that is embracing engineering design as well as computational thinking. Our program continues to improve itself to meet the changing demands.

Observation *(Be specific)*	**Evidence**	**Where?** *(Assessment, Course, Program)*	**Date** *(Year)*
Students score well above the passing score on the Praxis Technology Education (5051) exam.	Table 1.2 ● 95% pass rate - only one student did not pass in three year period. ● Scores well above the minimum state passing score (159).	Technology Education Praxis II Exam	2017–2019
After completing three years of our program sequence, students show proficiency across the six content areas measured by the Praxis exam.	Table 1.3 ● Average content area scores exceed 70% for five out of six areas.	Technology Education Praxis	2017–2019

Changes Made Based Upon Results (Most Important)

There are no major changes to report based on content knowledge relative to the Praxis exam. The faculty will continue to improve the pedagogical methods and instructional content in Technology & Engineering Education to maintain a vibrant and modern curriculum. Design, innovation, and prototyping continue to be the strengths of our courses, not to mention faculty expertise in technology and engineering education. Although the Praxis exams show that teacher candidates fell below 70% for the three year period in the areas of Energy, Power, and Transportation, they still accomplished a 95% pass rate. Faculty members will explore ways to improve these scores in the future. While a large-scale curricular change is unlikely, integrating more transportation topics into existing courses has been discussed. The faculty will continue to monitor this content area.

What Changes? *(Be specific)*	**Why?** *(What result led to this change?)*	**Where?** *(Assessment, Course, Program)*	**Date** *(Semester, Year)*

A content review will be performed for all of our ETE courses to determine if there is a need to change the curriculum.	The content area related to the Energy, Power, and Transportation portion has been the lowest content area over the past three years.	General content knowledge curriculum. ETE courses	June 2021 during summer retreat.

Assessment 2: EdTPA Assessment

Content Validity and Inter-rater Reliability Scores for EPP Created Assessments

a) **Content Validity**: Content validity process is conducted by the program, using templates provided by CAEP and the Office of Accreditation and Assessment, and the final scores go here.

b) **Inter-rater Reliability**: procedures are conducted by the program, using methods provided by CAEP and the Office of Accreditation and Assessment, and the final scores go here.

See: http://edtpa.aacte.org/wp-content/uploads/2019/12/Affirming-Validity-and-Reliability-of-edTPA.pdf

Report Data Tables

Teacher candidates in the Technology & Engineering Education (TEE) major complete the EdTPA assessment during the Fall semester of their senior year. EdTPA was implemented in the State of New Jersey in 2017 and the assessment became a requirement to be eligible for certification in 2019. The EdTPA scores are reported to the department monthly and were recorded for each cohort over the past three years (Table 2.1). Each of the 15 rubrics is aligned to the CAEP and InTASC standards. The EdTPA major tasks of Planning, Instruction, and Assessment align directly to the inTASC Standards of Planning for Instruction, Instructional Strategies, and Assessment, respectively.

During the 2017 - 2018 academic year, 10 teacher candidates completed the assessment with one student scoring an incomplete. During the 2018 - 2019 academic year, 6 teacher candidates completed the assessment with one student scoring an incomplete. During the 2019 - 2020 academic year, 4 out of the 5 teacher candidates who completed the assessment earned a passing score. One student had to resubmit to complete the requirement for certification. In the three year period, 21 teacher candidates took the assessment, a relatively low number, so the analysis is done in aggregate while still observing the year to year changes because of the EdTPA scores counting toward certificate eligibility in 2019-2020.

Table 2.1: Teacher candidate performance in EdTPA evaluation

	Description	CAEP	InTASC	2017-2018	2018-2019	2019-2020
Planni	1. Planning: Planning for Subject-Specific Understandings	1.1, 1.2, 1.3, 2, 5	2, 3, 4, 7, 8	3.2	2.8	3.2
	2. Planning: Planning to Support Varied Student Learning Needs	1.1, 1.2, 1.3, 2, 3.3, 3.4, 3.5, 5	2, 3, 4, 7, 8	3.1	2.6	3.4

ng	3. Analyzing Teaching: Using Knowledge of Students to Inform Teaching and Learning	1.1-1.5, 3.1-3.6	1, 2, 4, 7	2.6	2.4	2.8
	4. Academic Language: Identifying and Supporting Language Demands	1.1, 1.2, 1.3, 3.1-3.5, 5.1-5.5	1, 2, 4, 5, 8	3.1	2.6	3.0
	5. Planning: Planning Assessments to Monitor and Support Student Learning	1.1-1.5, 4.1, 4.2, 5	1, 6, 8	2.2	2.2	3.2
			Average task score	2.85	2.53	3.12
Instruction	6. Instruction: Learning Environment	1.1, 1.2, 1.3, 3, 4	2, 3, 8	3.2	3.0	3.2
	7. Instruction: Engaging Students in Learning	1.1-1.5, 3, 4.1, 4.2, 5	2, 3, 4, 5, 8	2.8	2.6	2.8
	8. Instruction: Deepening Student Learning	1.1-1.5, 3, 4.1, 4.2, 5	3, 4, 5, 8	2.9	2.2	2.8
	9. Instruction: Subject-Specific Pedagogy: Using Representations	1.1-1.5, 3, 4.1, 4.2, 5	3, 4, 5, 8	2.9	2.8	3.0
	10. Analyzing Teaching: Analyzing Teaching Effectiveness	2.1, 2.2, 2.3, 4, 5.1-5.5	9	2.4	2.6	2.8
			Average task score	2.84	2.60	2.92
Assessment	11. Assessment: Analysis of Student Learning	1.1-1.4, 4.1, 4.2, 5	6	2.3	3.0	2.8
	12. Assessment: Providing Feedback to Guide Learning	1.1-1.4, 4.1, 4.2, 5	6	1.8	2.8	3.2
	13. Assessment: Student Use of Feedback	1.1-1.4, 4.1, 4.2, 5	6	1.8	2.2	2.4
	14. Academic Language: Analyzing Students' Language Use and Subject-Specific Learning	1.1-1.5, 3, 4, 5	1, 2, 4, 5	2.8	2.6	3.2
	15. Analyzing Teaching: Using Assessment to Inform Instruction	1.1-1.5, 2.1-2.3, 4, 5	6, 7, 8, 9	2.3	3.0	2.4
			Average task score	**2.18**	**2.54**	**2.80**
n=10 (2017-18), n = 6 (2018-19), n=5 (2019-20)		**Overall Average Rubric Score**		**2.62**	**2.56**	**2.95**

Brief Analysis of Data Findings

The aggregate data for the three year period in Table 2.2 shows that teacher candidates were scored highest in the EdTPA planning rubrics (2.82) followed by the instruction rubrics (2.79). Teacher candidates were scored highest on planning rubric #2 (Planning to Support Varied Student Learning Needs).

The teacher candidates were scored lowest in the assessment rubrics (2.43). The EdTPA score analysis demonstrates the Assessment task as an area in need of improvement for our program. This is consistent with results from the Lesson Plan Assessment. For the most recent teacher cohort (2019-2020), the scores were lower than previous years on rubric #15 (Using Assessment to Inform Instruction). Furthermore, all cohorts scored below the cut score average on rubric #13 (Student Use of Feedback).

The 2019-2020 cohort had an overall average rubric score of 2.95 as compared to 2.62 for the 2017-2018 cohort. This improvement is most likely associated with the state mandated "cut score" going into effect. In previous years, teacher candidates were still required to complete the assessment and receive a score but were not required to meet a minimum cut score in order to be eligible for certification.

In general, from 2017 to 2020, there has been an increase in all three average task scores, partly due to a better understanding of the EdTPA by the faculty but also improvements made to the TEE program. For the InTASC standards 7) planning for instruction, 8) instructional strategies, and 9) assessment tasks, scores increased from 2.85 to 3.12, 2.84 to 2.92 and 2.18 to 2.80, respectively, over the three year period (Table 2.2). Figure 2.1 shows a dip in scores for InTASC standards 7) planning for instruction and 8) instructional strategies. This will be discussed at a department winter review meeting.

Table 2.2: Teacher candidate performance on EdTPA with respect to InTASC standards.

EdTPA Task	InTASC Standard	Description	2017-2018	2018-2019	2019-2020	Aggregate
Planning	7	Planning for Instruction	2.85	2.53	3.12	2.82
Instruction	8	Instructional Strategies	2.84	2.60	2.92	2.79
Assessment	6	Assessment	2.18	2.54	2.80	2.43
n=10 (2017-18), n = 6 (2018-19), n=5 (2019-20), Aggregate: n = 21.						

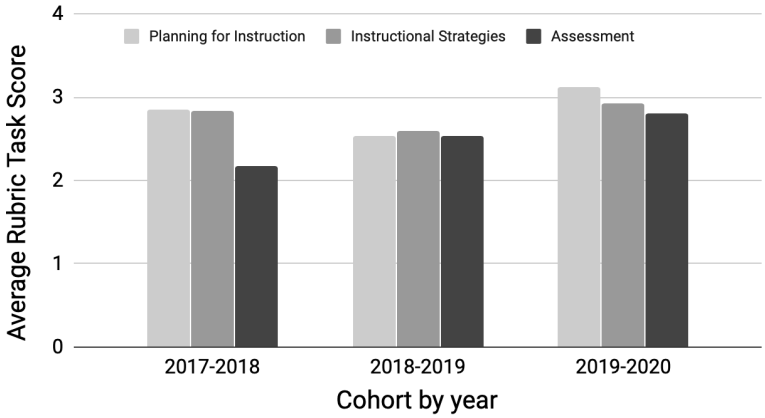

Figure 2.1. EdTPA tasks performance by cohort year (2017-2018, 2018-2019, 2019-2020)

Interpretation of How Data Provided Evidence for Candidates Meeting Standards

Observation *(Be specific)*	**Evidence**	**Where?** *(program, course, assessment)*	**Date** *(Semester, Year)*
Across all 15 EdTPA rubrics, the biggest strength was in Rubric 2: Planning to Support Varied Student Learning Needs	2019 - 2020 cohort was scored the highest in EdTPA Rubric #2: See table 2.1	TED480: Content and Methods course	Spring 2021
Across the board, the biggest weakness was in InTASC standard #6: Assessment.	Table 2.1 and table 2.2	TED380: Junior Professional Experience and TED480: Content and Methods course	Spring 2021
Specific low scores were found in EdTPA rubrics #13 (Student Use of Feedback) and #15 (Using Assessment to Inform Instruction)	Scores for the 2019-2020 cohort were 2.4 for these two rubrics and did not see modest increases from previous years. See table 2.1	TED380: Junior Professional Experience and TED480: Content and Methods course	Spring 2021

Changes Made Based Upon Results (Most Important)

What Changes? *(Be specific)*	**Why?** *(What result led to this change?)*	**Where?** *(Assessment, Course, Program)*	**Date** *(Semester, Year)*
TED480: Content and Methods course was moved to the TEE junior spring semester to coincide with clinical I. The course is front-loaded with lesson planning/class experiences and back-loaded with practicum experiences.	Significant increase in Clinical I placement hours (178.5), basically pre-student teaching, mandated across NJ. Requirement that hours must be semester directly before Clinical II	TED480, pedagogical course sequences	Spring 2017
More focus has been placed on the three major tasks. Concentrating these required skills in a smaller timeline to support TC learning.	This allowed for a more focused introduction to EdTPA and an opportunity to run a practice assessment during clinical 1. Teacher candidates also get observed twice during their practicum.	General Curriculum and TED480	Fall/Spring 2018
Improved Feedback (below, target, above)	Give students a measure so they could understand how they were performing for each rubric.	TED480	Spring 2019
Maintained consistency with clinical 1 instructors.	Prior to 2017, there was a new professor every semester.	Jamie Mulligan - TED380 Tanner Huffman - TED480	Spring 2018
New cooperating teachers Extra time to locate new placements New expectations of interactions	The pool of school districts for placements has changed due to adoption of EdTPA		Spring 2018
What do we plan to do in 2020 and 2021 to improve EdTPA scores?			

Assessment 3: ETE275 Safety Assessment for Technology & Engineering Educators

Alignment of Assessment with Program, InTASC and CAEP Standards

ETE275: Mechanics and Materials Laboratory is a sophomore level course for the Technology & Engineering Education majors and the Integrative STEM Education majors. It is an integrated laboratory experience designed for students to explore common material processing tools and machine practices. Students apply and synthesize skills and techniques they have learned in prerequisite and corequisite courses. Values of both capability and creativity are stressed in all process and laboratory work. A critical element of this class is ***safe laboratory practices*** on equipment, as well as how to manage safety in their K-12 classrooms/labs. Students must demonstrate skills and safety in all materials processing activities. An emphasis on design and workmanship is utilized in all teaching methods and demonstrations. Students are qualified through the safety program to operate basic machines in the materials laboratory. Each student receives a Machine Safety Program Manual (Attachment E: Machine Safety Program). Students receive additional instruction on teacher liability, methods for machine qualifications, general laboratory safety rules, metal processing safety rules, wood processing safety rules, general power equipment safety rules and general hand tool safety rules. Students view videos and take safety tests. When they have demonstrated satisfactory cognitive and performance competence, they are added to the "Approved to Operate Laboratory Equipment Form" (Attachment E: Machine Safety Program). Students on the approved list can attend open laboratory times and sign in to work. Similar assessments on skills for these equipment also showed high levels of proficiency. These skills data were obtained by looking at performance on several projects, leading up to a capstone build project. The final grades for the capstone build project are not part of this assessment.

The safety tests for each machine align well with inTASC 3 (learning environments), 4 (content), 5 (application of content). See table 1 in the Introduction. The typical equipment teacher candidates will use as Technology & Engineering Education teachers are the 1) Drill Press, 2) Miter Saw, 3) Jointer, 4) Table Saw, 5) Surfaces, 6) Band Saw, 7) Router, and 8) Lathe. Students need to be capable in operating these machines before they can be allowed to independently manage a safe laboratory environment.

Content Validity and Inter-rater Reliability Scores for EPP Created Assessments

At this point in time, data for content validity or inter-rater reliability on the safety tests was not collected.

Report Data Tables

Safety with equipment is a vital part of the program and is central to ETE275. As a part of this course teacher candidates are instructed on how to develop and maintain a safety management system within their own classrooms/labs. In addition, they themselves are tested on the safety concerns for a variety of pieces of equipment. Each student is required to take a safety quiz for 8 pieces of equipment, each worth 10 points. If in the first attempt, a student scores less than 10 points, then the student must write extensively on the questions they answered incorrectly, and retake the exam. They are not permitted from using the machine until they pass the test. The average of these "first quiz" grades for all students is recorded below in Table 3.1 for academic years 2017-18, 2018-19, and 2019-20. Also shown (in square brackets) are the averages for only the Technology & Engineering Education majors. The grades for these "first" safety quizzes are very high, typically averaging above 9 out of 10. The overall averages (last column in Table 3.1 are typically between 9.5 and 9.8 (out of 10).

Table 3.1: "First Quiz" Safety scores for ETE275, years 2017, 2018 and 2019. [Max. score per quiz is 10.]

Year	Drill Press	Miter Saw	Jointer	Table Saw	Surfacer	Band Saw	Router	Lathe	Overall Average
2017-18	9.4	9.4	9.1	9.0	9.3	9.3	9.3	9.8	9.3
N=23 [7]*	[9.8]*	[9.9]*	[9.5]*	[9.4]*	[9.6]*	[9.7]*	[9.7]*	[9.9]*	[9.7]*
2018-19	9.8	9.4	9.6	8.2	9.7	9.3	8.9	X	9.3
N=24 [6]*	[9.4]*	[9.5]*	[9.5]*	[8.9]*	[9.8]*	[9.6]*	[8.9]*	[X]*	[9.4]*
2019-20	9.7	9.5	9.4	9.3	9.9	8.9	9.4	10	9.5
N=18 [8]*	[9.7]*	[9.7]*	[9.7]*	[9.1]*	[10]*	[8.4]*	[8.9]*	[10]*	[9.4]*

*Note: The number in brackets is the average associated with only the Technology & Engineering Education majors. (The other students are K-6 iSTEM students).

X: Lathe safety quizzes not completed during 2018-2019.

Table 3.2 shows the average and standard deviation for the safety test scores for each machine for three years (2017-2020). The ETE275 course is offered every semester so the data include 6 semesters of one section of the course. N = 65.

Table 3.2: Three year (2017-2020) average of safety scores for each machine. N = 65 students.

	Drill Press	Miter Saw	Jointer	Table Saw	Surfacer	Band Saw	Router	Lathe *
average	9.63	9.43	9.37	8.83	9.63	9.17	9.2	9.9
stdev	0.21	0.06	0.25	0.57	0.31	0.23	0.26	0.14

Brief Analysis of Data Findings

All machine tests are included in the Appendix for reference. The test score data includes 65 students from both the iSTEM major and Technology & Engineering Education Major. All students who took the course were included in order to assess the effectiveness of the written safety tests and any discrepancies between the machine safety tests. The analysis of the average machine tests for all three years reveals that students have the most difficulty on the table saw safety tests with a mean test score of 8.83 pts and a relatively wide standard deviation of 0.57 (Figure 3.1). For all other machines, student averages were above 90%. The lathe safety test score is only reliable for 2017-2018 due to interruptions caused by the Armstrong Hall building renovation in 2019 and emergency remote teaching in 2020. The test scores are sorted here from lowest to highest average: Table Saw (8.83), Band Saw (9.17), Router (9.2), Jointer (9.37), Miter Saw (9.43), Drill Press (9.63), Surfacer (9.63) and Lathe (9.9).

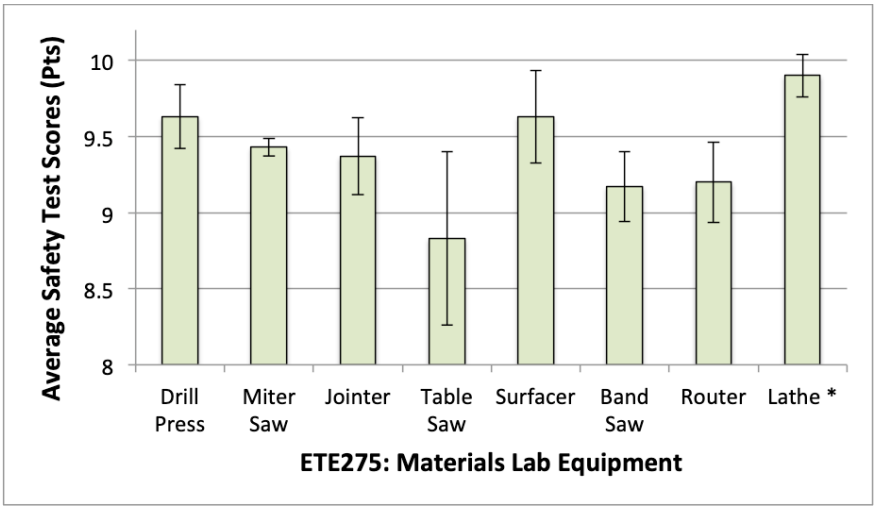

Figure 3.1: Average student safety test scores for ETE275: Materials Lab Equipment for years 2017 -2019. N=65. The lathe safety test score is only reliable for 2017-2018 due to building renovation in 2019 and emergency remote teaching in 2020.

Interpretation of How Data Provided Evidence for Candidates Meeting Standards

The safety tests for each machine align well with InTASC 3 (learning environments), 4 (content knowledge), 5 (application of content).

Observation *(Be specific)*	**Evidence**	**What data says about student candidates meeting standards**	**Action taken (or to be taken): course, rubric, programmatic, faculty, etc**
Students scored 91% or higher on machine safety	"First take" of Lab safety tests over a three-year period (2017 -2020). N = 65 students.	The test score data shows that students understand that they must pass each safety test before they can begin working	No action/changes necessary

assessments for 7 out of 8 machines.	See table 3.2.	with the machines. This practice is transferable to their future K-12 students.	
Students scored below 90% on the table saw safety test and it had the highest standard deviation relative to the other machine safety tests.	"First take" of Lab safety tests over a three-year period (2017 -2020). N = 65 students. See table 3.2.	This could indicate that students are finding the table saw safety test more difficult but it could also indicate that the instructor's approach is not aligning well with the expected outcomes	Faculty will examine safety tests at the 2021 summer retreat to determine if they need to be updated. Will consult with national safety standards for machine operation.

Changes Made Based Upon Results (Most Important)

What Changes? *(Be specific)*	**Why?** *(What result led to this change?)*	**Where?** *(Assessment, Course, Program)*	**Date** *(Semester, Year)*
It would be helpful to perform an independent observation of each teacher candidate's use of each machine mid semester to determine competency.	The "first take" safety test measures how well they understand the material and safety recommendations but does not measure their operational competency.	In-class ETE275	Spring 2021

Assessment 4: TED380 Unit and Lesson Plan Assessment

Two lesson plans are collected from each teacher candidate during the TED380: Junior Professional Experience (Clinical I) course, which occurs during the Spring Semester of their junior year. The assessment is conducted by a group of department faculty members during a faculty retreat. Each element is evaluated and a change in score is expected from the first and second lesson plan.

Content Validity and Inter-rater Reliability Scores for EPP Created Assessments

The content validity of the Lesson Plan Rubric elements was reviewed by 23 panelists. The panelists were composed of Advisory Board Members (6), Cooperating Teachers (9), Department Faculty (6) or Field Supervisors (2). Some of the panelists belong to more than one group. For example, some department faculty members are also field supervisors but only their primary affiliation is used here. Each panelist ranked the elements as 1) essential, 2) useful but not essential, or 3) not useful. The results were used to calculate Lawshe's Content Validity Ratio and the p-value of the binomial distribution (Table 4.1). A p-value < 0.05 indicates the validity of the element was significant. P-values > 0.05 are highlighted in yellow to facilitate discussion in the analysis section.

Table 4.1: Content Validity for Lesson Plan Rubric Elements (p-value < 0.05 indicates significance in validity)

Content Validity for Lesson Plan Rubric

Element	InTASC	Essential	Useful but not essential	Not Useful	CVR	p-value
Learning Goals and Standards	7	21	2	0	0.826	0.000
Lesson Beginning	8	16	7	0	0.391	0.017
Lesson or Unit Content	7	21	2	0	0.826	0.000
Subject Matter Knowledge	4	15	8	0	0.304	0.047
Instructional strategies and curricula	8	19	4	0	0.652	0.000
Assessment	6	23	0	0	1.000	0.000
Differentiation	2	17	6	0	0.478	0.005

Closure	6	13	10	0	0.130	0.202
Questioning	7	17	6	0	0.478	0.005
Transitions	7	12	9	2	0.043	0.339
Resources	7	10	11	2	-0.130	0.661
Unit Progression	8	12	11	0	0.043	0.339

Survey n = 23 (6 advisory board members, 9 cooperating teachers, 6 department faculty, 2 field supervisors)

Table 4.2 demonstrates the percentage of agreement by rubric element that was reached during inter-rater reliability training conducted during the Department of Integrative STEM Education's CAEP winter retreat on Thursday, January 23, 2020. During the meeting, a representative student lesson plan was evaluated independently by four department faculty members. The interpretation of each rubric element was carefully discussed, and each element was scored in a second round to achieve interrelated reliability of at least 75% on most categories. Elements with a percentage less than 75% are highlighted in yellow to facilitate discussion. After the second round, lesson plans were divided evenly between the faculty members and scored using the department rubric.

0 - Not demonstrated: Teacher candidate could not be assessed on these criteria because it was absent in their inquiry project.
1 - Unsatisfactory: Teacher candidate did not demonstrate competence on standard of performance.
2 - Basic: Teacher candidate demonstrated basic competence on standard of performance.
3 - Proficient: Teacher candidate exceeded basic competence on standard of performance, most of the time.
4 - Distinguished: Teacher candidate consistently and significantly exceeded basic competence on standard of performance.

Table 4.2: Inter-rater reliability of lesson plan rubric elements during two rounds of discussions by department faculty members (N=4).

Disposition	Associated Indicators				
Disposition *N = 4*	**Not Demonstrated (0)**	**Unsatisfactory (1)**	**Basic (2)**	**Proficient (3)**	**Distinguished (4)**
Learning Goals and Standards			1st rd: 50% 2nd rd: 100%		
Lesson Beginning				1st rd: 50% 2nd rd: 75%	
Lesson or Unit Content				1st rd: 100% 2nd rd: 100%	
Subject Matter Knowledge			2nd rd: 100%	1st rd: 50%	
Instructional strategies and curricula				1st rd: 75% 2nd rd: 100%	

Assessment		2nd rd: 100%	1st rd: 75%		
Differentiation	2nd rd: 100%	1st rd: 50%			
Closure		1st rd: 50% 2nd rdd: 75%			
Questioning		1st rd: 50% 2nd rd: 50%			
Transitions		2nd rd: 75%	1st rd: 75%		
Resources		2nd rd: 75%		1st rd: 50%	
Unit Progression	1st rd: 50% 2nd rd: 100%				

Report Data Tables

The lesson plans produced during Clinical 1 provide a snapshot of what teacher candidates understand about planning for instruction during their junior year. Table 4.3 shows the average change in lesson plan scores for two lesson plan evaluations. The table is organized by year for Fall 2017, Fall 2018, and Fall 2019. The total number of lesson plans reviewed was 21. The average progression corresponds to InTASC standards 2, 4, 6, 7, and 8. The aggregate change according to each InTASC standard is shown in Table 4.4 as well as the number of teacher candidates who scored proficient marks or higher during their second lesson plan evaluation.

Table 4.3: Unit and Lesson Plan Rubric Assessment Data

	Alignment with standards		Fall 2017		Fall 2018		Fall 2019	
Element	ITEA CTTE 2003	CAEP and InTasc	Average	Stand Dev	Average	Stand Dev	Average	Stand Dev
Learning Goals and Standards	6	7	0.375	0.916	-0.125	0.991	0.600	1.140
Lesson Beginning	9	8	-0.250	1.488	-0.500	0.756	0.200	0.447
Lesson or Unit Content	6	7	0.375	1.847	0.000	1.195	0.200	0.837
Subject Matter Knowledge		4	0.000	0.926	-0.125	0.835	-0.400	0.894
Instructional strategies and curricula	6	8	-0.375	1.061	-0.375	0.518	0.600	1.342

Assessment		6	0.000	0.756	0.000	1.512	-0.400	1.517
Differentiation	9	2	0.250	1.165	-1.000	1.309	0.200	0.447
Closure		6	-0.500	0.926	0.000	0.535	-0.200	1.304
Questioning		7	0.375	1.302	-0.500	1.414	-0.600	0.894
Transitions		7	0.500	1.195	-0.625	1.188	-0.600	1.140
Resources	6	7	0.250	1.982	-0.750	1.165	0.200	1.483
Unit Progression		8	0.125	1.808	-0.125	1.885	0.000	0.707

Brief Analysis of Data Findings

The data from the unit and lesson plan assessment uncovers a few areas of improvement for the Technology & Engineering Education program. The first thing that is notable about the 3 year cohorts in aggregate is the change in average score between the first lesson plan and the second lesson plan with respect to the InTASC Standards. For all, InTASC standards aligned to this rubric: 2: Learning Differences, 4: Content Knowledge, 6: Assessment, 7: Planning for Instruction, and 8: Instructional Strategies **the scores decreased** (Table 4.4). In addition, during the second lesson plan evaluation less than 50% of junior year teacher candidates scored below proficient for InTASC standards 2: Learning Differences, 6: Assessment, 7: Planning for Instruction, and 8: Instructional Strategies. Two-thirds of junior year teacher candidates scored proficient or higher for Standard 4: Content Knowledge. A faculty review of the pedagogical methods sequence from TED280/ TED380/ TED480 /TED460 is recommended to make improvements.

Table 4.4: Aggregate change in lesson plan scores according to InTASC Standards and percentage of TCs who were proficient during the second lesson plan evaluation.

InTASC Standard	2017 - 2019 Aggregate change (n = 21)	TCs at proficient or higher (2nd evaluation, n = 21)
2 - Learning Differences	-0.24	9.5 %
4 - Content Knowledge	-0.14	66.7 %
6 - Assessment	-0.17	23.8 %
7 - Planning for Instruction	-0.02	41.9 %
8 - Instructional Strategies	-0.13	38.1 %

Interpretation of How Data Provided Evidence for Candidates Meeting Standards

Observation *(Be specific)*	**Evidence**	**Suggested change**	**Where? (course, programmatic, rubric, faculty)**

The lesson plan rubric shows significance in content validity for all elements except: closure, transitions, resources, and unit progression.	See Table 4.1 Significant if P-value < 0.05 Not significant if p-value > 0.05	Review definitions and understandings of these rubric elements.	Conversation about elements during advisory board members and supervisors.
The faculty panel who reviewed the lesson plans showed high inter-rater reliability for all lesson plan elements except for questioning	After two rounds of discussions, the inter-rater reliability was at 50% for the element of questioning..	Rewrite the questioning element following the progressions of InTASC Standard #5 Application of Content and #8 Instructional Strategies	Unit and Lesson Plan Rubric and implement in TED280 and TED380 courses
The evaluation of the second lesson plan in Clinical 1 reveal strengths in InTASC Standard #4: Content Knowledge	66.7% of students scored proficient or higher in the Standard #4: Content Knowledge		All semesters
The evaluations of the second lesson plan in Clinical 1 reveal a low percentage of students scoring proficient or higher in 4 InTASC standards.	See table 4.4. Below 50% for the following: Standard #2: Learning Differences Standard #6: Assessment Standard #7: Planning for Instruction Standard #8: Instructional Strategies	Allow instructor to give more feedback on 1st lesson plan assignment as well as model effective feedback for students. Facilitate peer review feedback sessions on lesson plans.	TED380: Junior Professional Experience (Clinical 1) - Spring 2021

Changes Made Based Upon Results (Most Important)

What Changes? *(Be specific)*	**Why?** *(What result led to this change?)*	**Where?** *(Assessment, Course, Program)*	**Date** *(Semester, Year)*
Introduce Lesson Plan Template and Rubric in an earlier course in the sequence.	This report gives us important insight on how students are communicating their instructional plan on paper.	TED280: Introduction to Technology Education	Fall 2020

Lesson plan submissions are going to be placed in a department google Drive folder where they can be stored until the faculty panel review. File name will include the date.	Measuring a progression of InTASC standards can be improved by requiring a submission date in the file name. Many lesson plans did not have a date when reviewed so our process will be more consistent when we know the time elapsed between lesson plan submissions.	TED380: Junior Professional Experience (Clinical I)	Spring 2021
Changes to the structure of the clinical experience were implemented in Spring 2017 in response to state wide EdTPA requirements	The TED380 course contained the lesson plan writing units.	Clinical structure changes	Spring 2017
Faculty assignments for Clinical I and Clinical II have become consistent semester to semester since Spring 2017	The department had several faculty hires in the past 5 years which have improved the structure of the Clinical experiences.	Faculty instructors: - James Mulligan - Tanner Huffman - Melissa Zrada	 Spring 2017 Spring 2018 Spring 2021

Assessment 5: TED490 Professional Disposition Assessment

Content Validity and Inter-rater Reliability Scores for EPP Created Assessments

The content validity of the Professional Dispositions Rubric elements were reviewed by 22 panelists. The panelists were composed of Advisory Board Members (5), Cooperating Teachers (9), Department Faculty (6) or Field Supervisors (2). Some of the panelists belong to more than one group. For example, some department faculty members are also field supervisors but only their primary affiliation is used here. Each panelist ranked the elements as 1) essential, 2) useful but not essential, or 3) not useful (Table 5.1). The results were used to calculate Lawshe's Content Validity Ratio and the p-value of the binomial distribution. A p-value < 0.05 indicates the validity of the element was significant. P-values > 0.05 are highlighted in yellow to facilitate discussion. According to the data, most panelists agree that all the rubric elements are essential to evaluate teacher candidates with the exception of two elements: Professional Organizations for Students ($p = 0.992$) and Leadership ($p = 0.738$).

Table 5.1: Content Validity for Professional Dispositions Rubric

Rubric elements	essential	useful but not essential	not useful	CVR	p-value
Own Learning	21	1	0	0.909	0.000
Processes of Technology	15	6	1	0.364	0.026
Own Initiative	17	5	0	0.545	0.002
Professional Organizations for students	5	14	3	-0.545	0.992
Student Learning	20	2	0	0.818	0.000
Student Diversity	17	5	0	0.545	0.002
Learning Environment: varied experiences	18	4	0	0.636	0.000
Challenging Situations	21	1	0	0.909	0.000
Criticism	18	4	0	0.636	0.000
Ethics	20	2	0	0.818	0.000
Professionalism	20	2	0	0.818	0.000
Interpersonal Relationships	19	3	0	0.727	0.000
Social Interaction	19	3	0	0.727	0.000
Leadership	9	13	0	-0.182	0.738
Self-awareness	17	5	0	0.545	0.002
Professional self-improvement	17	5	0	0.545	0.002

Survey n = 22 (5 advisory members, 9 cooperating teachers, 6 department faculty, 2 field supervisors)

Inter-rater reliability information not available for this assessment.

Report Data Tables

The professional disposition rubric assessment is completed twice during the Clinical 2 experience: 1) the midterm evaluation and 2) the final evaluation. The assessment measures 16 elements related to professional dispositions. Table 5.2 shows the alignment of each element to the ITEA CTTE 2003 Standards as well as the CAEP and InTASC teaching standards. The relevant InTASC standards measured by this assessment are: 1 Learner Development, 2 Learning Differences, 3 Learning Environments, 8 Instructional Strategies, 9 Professional Learning and Ethical Practice, and 10 Leadership and Collaboration. The table shows the midterm scores, final scores, and delta change for each rubric element for Fall 2017, Fall 2018, and Fall 2019. The total number of teaching candidates evaluated with the rubric over the three year period is 20. In general teacher candidates show a positive progression from the midterm to the final

reviews. The one exception is in 2019 when teacher candidates show a negative progression (or no progression) in the elements of processes of technology, professional organizations for students, ethics, and interpersonal relationships (table 5.2 highlighted in yellow). All four of these elements correspond to InTASC standard 9 Professional Learning and Ethical Practice.

Table 5.2: Professional Disposition Rubric Assessment Data

Element (dispositions toward..)	standards			2017 (n = 9)			2018 (n = 6)*			2019 (n = 5)*		
	ITEA CTTE	CAEP	InTASC	mid	final	Δ	mid	final	Δ	mid	final	Δ
own learning	6, 9		8	3.44	3.64	0.20	3.00	3.67	0.67	3.50	3.60	0.10
processes of technology	10	9	9	3.62	3.83	0.21	3.52	3.83	0.31	4.00	4.00	0.00
own initiative	6, 7		8	3.00	3.64	0.64	2.80	3.33	0.53	3.50	3.60	0.10
professional organizations for students	10	9	9	3.22	3.67	0.44	1.65	2.96	1.31	2.00	1.60	-0.40
student learning	9	1.1- 1.3	1	3.50	3.72	0.22	3.00	3.50	0.50	3.25	3.80	0.55
student diversity	6, 7	1.1	2	3.62	3.67	0.04	3.50	3.80	0.30	3.00	4.00	1.00
learning environment: varied experiences	8	1.1	3	3.50	3.82	0.32	2.80	3.67	0.87	3.50	3.60	0.10
challenging situations	7		8	3.22	3.61	0.39	2.80	3.28	0.48	3.50	3.80	0.30
criticism			10	3.44	3.56	0.11	3.70	3.83	0.13	3.75	3.80	0.05
ethics	7		9	3.78	3.89	0.11	3.40	3.83	0.43	4.00	3.80	-0.20
professionalism	10	9	9	3.67	3.89	0.22	3.60	3.67	0.07	3.50	3.80	0.30
interpersonal relationships	10	9	9	3.67	3.83	0.17	2.80	3.63	0.83	3.75	3.60	-0.15
social interaction	9		3	3.20	3.72	0.52	2.80	3.83	1.03	2.75	3.20	0.45
leadership	6, 10	9	10	2.72	3.32	0.60	2.20	3.30	1.10	2.38	2.60	0.23
self-awareness	7		8	3.44	3.58	0.13	3.00	3.50	0.50	3.75	3.80	0.05
professional self-improvement	10	9	9	3.24	3.51	0.27	2.60	3.20	0.60	3.50	3.60	0.10

NCATE/ITEA/CTTE Program Standards (2003) Programs for the Preparation of Technology Education Teachers; 2013 CAEP Standards; InTASC Principles (2013)

- For 2018, one student did the first half of student teaching abroad so a midterm assessment was not possible.
- For 2019, one student did the first half of student teaching abroad so a midterm assessment was not possible.

Brief Analysis of Data Findings

Table 5.3 shows the professional disposition change from midterm to final evaluation for each InTASC Standard for 2017, 2018, 2019, and the aggregate of the three years. The aggregate change demonstrates that teacher candidates evaluations improve in the Clinical 2 experience from midterm to final. In 2019, there was a negative progression in Standard 9: Professional Learning and Ethical Practice as well as lower measured changes in all categories except Standard 2: Learning Differences.

Table 5.3: Measured change of professional dispositions organized by InTASC standards

InTASC Standard	Description	2017 (n = 9)	2018 (n = 6)	2019 (n = 5)	Aggregate Change (n = 20)
1	Learner Development	0.22	0.50	0.55	0.32

2	Learning Differences	0.04	0.30	1.00	0.33
3	Learning Environments	0.42	0.95	0.28	0.49
8	Instructional Strategies	0.34	0.55	0.14	0.31
9	Professional Learning and Ethical Practice	0.24	0.59	-0.06	0.24
10	Leadership and Collaboration	0.36	0.62	0.14	0.31

Even though there was an average positive progression in their professional dispositions there were still a small number of teacher candidates who scored below proficient in their final evaluation (Table 5.4). There were 3 out of 20 teacher candidates (or 15%) who scored below proficient in InTASC Standard #10: Leadership and Collaboration.

Table 5.4: Number of candidates scoring below "proficient" in their summative professional dispositions evaluation

InTASC Standard Description	Number of candidate scores below "proficient" (final evaluation)
1 - Learner Development	1
2 - Learning Differences	0
3 - Learning Environments	1
8 - Instructional Strategies	1
9 - Professional Learning and Ethical Practice	1
10 - Leadership and Collaboration	3

N = 20 candidates, between 2017 - 2019

Figure 5.1 shows the aggregate midterm evaluation scores compared to the final evaluation scores for the three years (2017-2019) with respect to the InTASC standards: 1 Learner Development, 2 Learning Differences, 3 Learning Environments, 8 Instructional Strategies, 9 Professional Learning and Ethical Practice, and 10 Leadership and Collaboration. For all the standards, the aggregate cohort of teacher candidates is above proficient and demonstrates progression from midterm to final evaluation. The largest change is in Learning environments. The improvement by the time of the final assessment is attributed to various reflective practitioner exercises on the part of the students, as well as to feedback from the cooperating teacher and college supervisor.

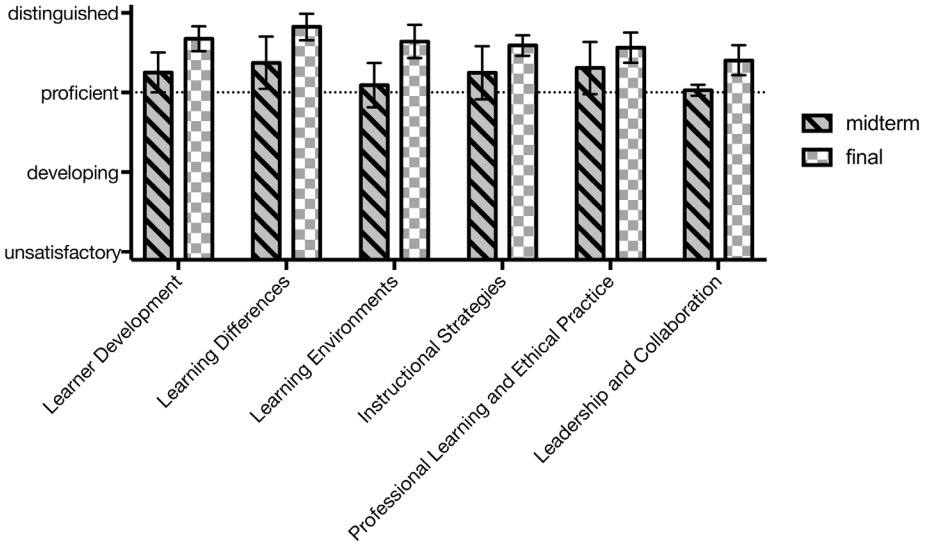

Figure 5.1: Professional Dispositions data, averaged midterm and final evaluations 2017-2019 according to the InTASC Standards.

Interpretation of How Data Provided Evidence for Candidates Meeting Standards

Observation *(Be specific)*	**Evidence**	**What data says about student candidates meeting standards**	**Action taken (or will be taken): course, rubric, programmatic, faculty, etc.**
The content validity on all the elements on the department's professional dispositions rubric were significant except for 2 elements.	Content Validity p-values are less than 0.05 for all elements except for: - Dispositions toward professional organizations for students - Dispositions toward leadership See Table #5.1 Content Validity	Both of these elements relate to InTASC standard 10 Leadership. This has implications for our teacher candidates rubrics and perhaps how student supervisors value or understand leadership qualities. In addition, 3 out of 20 teacher candidates scored below proficient in this area.	Conversation about elements during advisory board meeting and student supervisor kickoff meeting to decide if we are going to add them to the new Educator disposition Assessment (EDA). To improve our alignment with the School of Education we are switching from the department level rubric to the campus wide EDA.
Inter-rater reliability for this rubric was not established during the past three-year cycle.	No data related to inter-rater reliability was collected for the 2017-2019 cycle.		During the student teaching supervisor meeting, the placement coordinator will perform inter-rater reliability measures using the Educator Disposition Assessment (EDA). - August 2020
Candidates continue to grow during Clinical II in the following InTASC Standards: 1, 2, 3, 8, 9, 10	See aggregate Figure 5.1	On average, teacher candidates are evaluated as proficient in their midterm and final assessment	No change necessary

		See table 5.4 for number of students below proficient	
Only the student supervisor scores the student on their midterm and final assessments.	The current department level student teaching protocol only requires the student teaching placement coordinator to collect professional disposition rubric data at the midterm and final evaluations by the student supervisor.	Even though each student supervisor observes their teacher candidate seven times during the clinical II semester, assessments are only collected on two visits. It perhaps does not provide a complete evaluation of the teacher candidate's capabilities.	Assessment data will be collected on the EDA through LiveText for both the cooperating teacher and the student teaching supervisor starting in Fall 2020.
The majority of students in the 2017-2019 cohort demonstrate mastery of InTASC standards on their final assessment.	The aggregate data chart shows the percentage of students showing proficiency: 85% for leadership and collaboration 95% for learner development, learning environments, instructional strategies, and professional learning and ethical practice 100 % for learning differences	Teacher candidates demonstrate proficiency in InTASC standards	No change required.

Changes Made Based Upon Results (Most Important)

The most important change is the school wide decision to switch from the department level rubric to the campus wide Educator Disposition Assessment starting in Fall 2020. The department level professional dispositions rubric will no longer be used. We are still interested in understanding why teacher candidates scored lowest on InTASC Standard 9 Professional Learning and Ethical Practice and 10 Leadership. An advisory board meeting will take place in summer 2021 to review the pedagogical methods sequence from TED280/ TED380/ TED480 /TED460.

Assessment 6: TED490 Teaching Performance Assessment

Content Validity and Inter-rater Reliability Scores for EPP Created Assessments

The content validity of the Teacher Performance Rubric elements were reviewed by 22 panelists. The panelists were composed of Advisory Board Members (5), Cooperating Teachers (9), Department Faculty (6) or Field Supervisors (2). Some of the panelists belong to more than one group. For example, some department faculty members are also field supervisors but only their primary affiliation is used here. Each panelist ranked the elements as 1) essential, 2) useful but not essential, or 3) not useful (Table 6.1). The results were used to calculate Lawshe's Content Validity Ratio and the p-value of the binomial distribution. A p-value < 0.05 indicates the validity of the element was significant. P-values > 0.05 are highlighted in yellow to facilitate discussion. According to the data, most panelists agree that all the rubric elements are essential to evaluate teacher candidates with the exception of four elements: Integration of technology with other fields (p = 0.738), transitions (p = 0.143), closings (0.262), flexible and adaptable learning environments (0.857), and Improvement of technology curriculum (0.933).

Table 6.1: Content Validity for Teaching Performance Rubric

element	essential	useful but not essential	not useful	CVR	p-value
written lesson plan	15	6	1	0.364	0.026
subject matter knowledge	17	5	0	0.545	0.002
integration of technology with other fields	9	12	1	-0.182	0.738
technology & engineering teaching practices	21	1	0	0.909	0.000
motivation and student interest	19	2	1	0.727	0.000
teacher presence	19	3	0	0.727	0.000
instructional effectiveness	22	0	0	1.000	0.000
transitions	13	8	1	0.182	0.143
closings	12	10	0	0.091	0.262
flexible and adaptable learning environments	8	14	0	-0.273	0.857
materials	19	3	0	0.727	0.000
developmental appropriate practices/differentiated instruction	18	4	0	0.636	0.000
questioning and responsiveness	19	3	0	0.727	0.000
learning environment: motivate, design & innovation	20	2	0	0.818	0.000
classroom management	20	2	0	0.818	0.000

assessment	19	3	0	0.727	0.000
laboratory safety	21	1	0	0.909	0.000
lesson reflections	15	7	0	0.364	0.026
improvement of technology curriculum	7	13	2	-0.364	0.933
student learning, as impacted by curricular activities	19	2	1	0.727	0.000
demonstrate sensitivity to diverse learners	16	6	0	0.455	0.008

Survey n=22 (5 advisory board members, 9 cooperating teachers, 6 department faculty, 2 field supervisors)

Inter-rater reliability information not collected for this assessment.

Report Data Tables

The teaching performance rubric assessment is completed twice during the Clinical 2 experience: 1) the midterm evaluation and 2) the final evaluation. The assessment measures 21 elements related to teaching performance characteristics. Table 6.2 shows the alignment of each element to the ITEA CTTE 2003 Standards as well as the CAEP and InTASC teaching standards. The department teaching performance rubric assessment aligns well with all 10 InTASC standards. The table shows the midterm scores, final scores, and delta change for each rubric element for Fall 2017, Fall 2018, and Fall 2019. The total number of teaching candidates evaluated with the rubric over the three year period is 20. In general teacher candidates show a positive progression from the midterm to the final reviews. The one exception is in 2019 when teacher candidates show a negative progression in the element of questioning and responsiveness (table 6.2 highlighted in yellow). This element corresponds to InTASC standard 8 Instructional Strategy.

Table 6.2: Teaching Performance Assessment Rubric Data

	standards			2017 (n=9)			2018 (n=6)			2019 (n=5)		
element	ITEA CTTE	CAEP	InTASC	mid	final	Δ	mid	final	Δ	mid	final	Δ
written lesson plan	6		7	2.84	3.39	0.54	2.60	3.47	0.87	2.65	3.40	0.75
subject matter knowledge	1–5	1.1–1.5	4	3.37	3.84	0.48	3.04	3.42	0.38	3.13	3.60	0.48
integration of technology with other fields	6		5	2.92	3.56	0.64	2.90	3.67	0.77	2.45	2.80	0.35
technology & engineering teaching practices	7		8	3.00	3.56	0.56	3.12	3.67	0.55	3.25	3.80	0.55
motivation and student interest	8		1	3.33	3.53	0.20	3.10	3.83	0.73	3.50	4.00	0.50
teacher presence	7		8	3.42	3.67	0.24	2.50	3.47	0.97	2.88	3.40	0.53
instructional effectiveness	7		9	3.16	3.66	0.50	3.00	3.48	0.48	3.25	3.60	0.35
transitions	7		8	2.92	3.42	0.50	2.70	3.48	0.78	2.75	3.00	0.25

closings	7		8	3.17	3.28	0.11	2.60	3.33	0.73	2.75	3.00	0.25
flexible and adaptable learning environments	8		3	3.28	3.72	0.44	1.90	3.50	1.60	2.75	3.00	0.25
materials	7		7	3.38	3.53	0.16	3.60	3.67	0.07	2.75	3.60	0.85
appropriate practices/ differentiated instruction	9		2	2.67	3.47	0.80	2.72	3.45	0.73	3.25	3.80	0.55
questioning and responsiveness	7		8	3.03	3.39	0.36	2.60	3.43	0.83	3.75	3.60	-0.15
learning environment: motivate design, innovate	8		3	3.64	3.98	0.33	3.00	3.67	0.67	3.50	3.80	0.30
classroom management	7		8	3.33	3.67	0.33	2.72	3.33	0.61	3.13	3.60	0.48
assessment	7		6	2.78	3.11	0.33	2.70	3.18	0.48	1.25	3.00	1.75
laboratory safety	4, 8		3	3.67	4.00	0.33	2.80	3.17	0.37	2.25	3.80	1.55
lesson reflections	7	5	9	3.56	3.67	0.11	3.00	3.67	0.67	3.25	3.80	0.55
improvement of technology curriculum	10		10	3.14	3.56	0.41	2.00	3.50	1.50	1.75	3.40	1.65
student learning from curricular activities	7		1	3.48	3.82	0.34	3.00	3.67	0.67	3.40	3.80	0.40
demonstrate sensitivity to diverse learners	9		2	3.24	3.64	0.40	3.20	3.83	0.63	2.75	4.00	1.25

NCATE/ITEA/CTTE Program Standards (2003) Programs for the Preparation of Technology Education Teachers; 2013 CAEP Standards; InTASC Principles (2013)

Brief Analysis of Data Findings

Figure 6.1 shows data from the *Teaching Performance* assessment, aggregated from all three cohorts 2017 (n=9), 2018 (n=6), and 2019 (n=5). The plot displays average candidate scores at both mid-semester and end-of-semester points during the Clinical II (student teaching) experience. Each cohort attained an average score of at least "proficient" in all 10 InTASC standards by the end of the semester, and in most cases substantially exceeded the "proficient" threshold. In the majority of instances, average candidate performance fell below "proficient" level at the midterm assessment. The improvement to "proficient" or better by the time of the final assessment is attributed to various reflective practitioner exercises on the part of the students, as well as to feedback from the cooperating teacher and college supervisor.

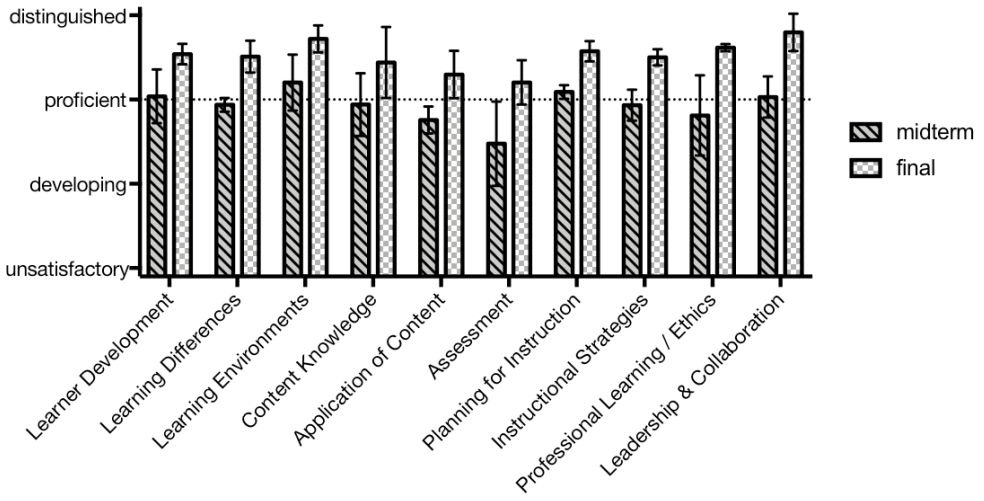

Figure 6.1: Teaching Performance assessment data, averaged midterm and final evaluations 2017-2019 according to the InTASC Standards.

Interpretation of How Data Provided Evidence for Candidates Meeting Standards

When looking at individual candidate performances, 86% of all total InTASC standard scores were rated as "proficient" or better by the final assessment. Seventy percent of candidates obtained "proficient" or higher scores in all 10 InTASC standards categories by the final assessment. In instances where candidates did not attain "proficient" status by the final assessment for an specific InTASC standard, the average score was 2.52 (approximately midway between "developing" and "proficient"). An examination of the number of instances in which individual students obtained a score less than "proficient" on particular InTASC standards is described in Table 6.3.

Table 6.3: Examination of Individual Candidate InTASC Candidate Scores Less than "Proficient"

InTASC Standard	standard description	Number of candidate scores below "proficient"
1	Learner Development	2
2	Learning Differences	2
3	Learning Environments	2
4	Content Knowledge	0
5	Application of Content	1
6	Assessment	2
7	Planning for Instruction	1
8	Instructional Strategies	3
9	Professional Learning/Ethics	0
10	Leadership & Collaboration	1

n = 20 candidates, between 2017 and 2019

Changes Made Based Upon Results (Most Important)

What Changes? *(Be specific)*	**Why?** *(What result led to this change?)*	**Where?** *(Assessment, Course, Program)*	**Date** *(Semester, Year)*

Identify those best practices that lead to student success in these areas and ensure that all candidates receive adequate training and feedback in these best practices. It is the aim that all candidates demonstrate mastery on all InTASC standards.	In the period of 2017–2019, aggregated data show that candidates demonstrated mastery (defined as "proficient" or above) on all InTASC standards on the final assessment of the *Teaching Performance* rubric.	TED 490 (Clinical II) course	Fall senior year
We will implement a Professional Sequence review to focus on candidate training, specifically with regards on the highlighted InTASC standards. We will be particularly attentive to topics of instructional strategies, learner development, learning differences, learning environments, and assessment.	Three candidates of 20 scored below "proficient" on the final assessment for InTASC standard 8 (instructional strategies). Two candidates of 20 scored below "proficient" on the final assessment for InTASC standards 1 (learner development), 2 (learning differences), 3 (learning environments), 6 (assessment)	program	Sophomore, junior and senior years
We need to continue looking for more ways to evaluate the content we value for Technology & Engineering Education. We will be discussing implementing engineering dispositions assessment in the design focused courses, based on engineering habits of mind. We will likely administer this assessment at various points in the program (entrance, mid, and exit).	Current data collection structure is limited.	program	Program entrance, midpoint, and end
We will be having stakeholder meetings to consider modifying and/or clarifying rubrics? The aim of this effort is to reach consensus among constituents about what we're looking for in various rubric elements and why those elements exist. We will also be making sure that we are using the most contemporary terms	There were 5 areas of the Teaching Performance Assessment rubric where key stakeholders had significantly differing views of content validity.	program	

and understandings in these rubrics.			

Summary

- Do we need to write one?

Appendix: ETE275 Safety Tests