

ROPA Report of UVM New CS Program Review

Response to Reviewers

June 23, 2020

The Vermont Standards Board for Professional Educators (VSBPE) authorized a Review Team to conduct a review of UVM's proposed new Computer Science program. The review occurred on March 31, 2020. Members of the Review Team were Lyle Jepson, Chair, Director of the CTE Program at Vermont Technical College; Pam Barclay, Technology Director for the Colchester School District and licensed Computer Science educator; Jennifer Fribush, Computer Science educator and member of the VSBPE; and Ellen Cairns, AOE ROPA Coordinator.

Due to the current mandate for Vermonters to "Stay Home, Stay Safe" during the Covid-19 pandemic, this was the first ROPA review done virtually. The interviews and team work time were conducted via Zoom. The ROPA review team wishes to thank UVM for their flexibility in conducting this review during this challenging time. The team also commends UVM for the care and long-term planning they have done to get this new program up and running, and agrees with UVM leadership when they stated that it is a program for the future.

Overall, the team found adequate evidence to recommend UVM's new Computer Science program for VSBPE approval at the Undergraduate (both minor and major/concentration paths) and Graduate levels, contingent upon one concern being addressed (Not all endorsement competencies have evidence of being met, particularly 1.5.1, 1.5.2, 1.5.3, 1.7.5, 1.8.2., and 1.8.3). The team focussed our attention on Standard I, as that is where the endorsement competencies come into play. We relied on UVM's 2018 ROPA approval for much of the evidence for Standards II-IV, as there is more similarity among programs throughout the institution for those standards. The other conditions in the report below will need to be met by June 30, 2022, and evidence should be submitted in a Two-Year Report by that date.

May need additional charts if different ratings for minor, major, undergraduate, and graduate programs- if ratings are the same, can consolidate

Standard	Title	Rating of Evidence
1	Content Knowledge, Pedagogy, and Professional Dispositions	Partial
2	Systems of Assessment	Satisfactory

3	Field Experiences	Satisfactory
4	Resources and Practices	Satisfactory

Standard 1--Content Knowledge, Pedagogy, and Professional Dispositions

Provider ensures that candidates have the necessary content and pedagogical knowledge to help all students learn and to create learning experiences that make the discipline accessible and meaningful for learners.

Rating for Standard One:

Indicators	Evidence	Rating
<p>1.1 – Candidates understand the central concepts, tools of inquiry, and structures of the discipline(s) they are planning to teach.</p>	<p>From I.P.:</p> <ul style="list-style-type: none"> • Curriculum maps, syllabi <p>From interviews:</p> <ul style="list-style-type: none"> • An interviewee stated that the goal was to replicate other sub-endorsement areas as far as oversight of the endorsement competencies in the future. • For MAT program, IP and interviewee indicated there would be a transcript review to ensure that teacher candidates had met all endorsement requirements before joining the program to determine what additional coursework would be needed; however, there were no explicit procedures shared with us that ensure that this process will take place or what the process will be. 	<p>Partial Evidence</p> <p>For this indicator, we conducted a rigorous review of the syllabi to determine if all endorsement competencies were fully covered. We found some gaps that are detailed in the Concerns section below.</p>

<p>1.2 – Candidates use technologies within their discipline(s), apply them appropriately, and guide learners to use technology in a safe and effective way.</p>	<p>From IP:</p> <ul style="list-style-type: none"> • Syllabi, especially EDSC011. However, when the team asked about adding EDSC 011 to the crosswalk, UVM stated, “only those students in the undergraduate secondary education program would take this course”- so it can’t be used as evidence across all programs. • Current gap in meeting CSE standards 1.8.2 and 1.8.5, especially at the undergraduate minor level, indicates that candidates may not be learning how to guide students to use technology safely. <p>From interviews:</p> <ul style="list-style-type: none"> • New building adjacent to Votey Hall has tech-enhanced classrooms. 	<p>Partial Evidence</p> <p>There is ample evidence for the first half of the indicator, but not for the second half; specifically “guide learners to use technology in a safe and effective way.”</p>
<p>1.3 – Candidates have the necessary pedagogical knowledge in their endorsement area to design and implement learning experiences that are research-based and promote each learner’s achievement of content.</p>	<p>From IP:</p> <ul style="list-style-type: none"> • EDSC 237 syllabus • In addition, “students completing the Secondary Education program acquire more general pedagogical knowledge in their Secondary Education courses and field work (e.g., EDSC 216, EDSC 226, EDSC 230).” <p>From interviews:</p> <ul style="list-style-type: none"> • EDSC237 is still being finalized and several additional topics need to be added. 	<p>Satisfactory Evidence</p>
<p>1.4 – Candidates understand and use multiple methods of assessment to measure student learning and use results to adjust their instruction to meet learners’ needs.</p>	<p>From IP:</p> <ul style="list-style-type: none"> • EDSC 237 • “Additionally, students in the Secondary Education program complete EDSC 216, Curriculum, Instruction, and Assessment for the Secondary School Teacher.” • CAEP approval 	<p>Satisfactory Evidence</p>

<p>1.5 – Candidates understand how learners grow and develop; recognize learner differences in cognitive, linguistic, social, emotional, and physical areas; and design and implement developmentally appropriate and relevant learning experiences.</p>	<p>From IP:</p> <ul style="list-style-type: none"> • All secondary candidates take EDTE 001, EDSP 005 and EDTE 056. • Syllabi for EDSC207-Sp 2020 Development, EDTE056, EDSC237 Teaching CS in Secondary School 2020, EDSP 005 - Issues Affecting Persons with Disabilities, EDTE 001-Fall 2019 Exploring Ed • CAEP approval 	<p>Satisfactory Evidence</p>
<p>1.6 – Candidates understand individual differences, diverse cultures and communities, and create inclusive learning environments enabling all students to learn.</p>	<p>From IP:</p> <ul style="list-style-type: none"> • “Candidates for endorsement will have completed foundational courses focused on creating inclusive learning environments for diverse learners, including a course focused on learners with disabilities (EDSP 005), English Language Learners (EDTE 056), and societal perspectives (EDFS 002). Additionally, EDSC 237 addresses approaches to addressing individual learning differences in the context of Computer Science Education.” • CAEP approval 	<p>Satisfactory Evidence</p>
<p>1.7 – Candidates understand and demonstrate professional responsibility that is guided by legal and ethical principles and engage in ongoing professional learning.</p>	<p>From IP:</p> <ul style="list-style-type: none"> • Department of Education Handbook • Previous ROPA visit. • CAEP approval 	<p>Satisfactory Evidence</p>

Commendation(s):

- New building and resources that have been put in place for this program will ensure that candidates have the technology necessary for meeting the content requirements of the endorsement.

- Basic foundational Education courses have strong evidence for the indicators related to learning and cultural differences (1.5 and 1.6).

Concern(s):

- Not all endorsement competencies have evidence of being met, particularly 1.5.1, 1.5.2, 1.5.3, 1.7.5, 1.8.2., and 1.8.3.

Response: CSE Website was created to demonstrate evidence that listed competencies are being met for CS courses: <https://rerickso.w3.uvm.edu/cse/index.php>

1.5.1: This is covered in Module 2 of CS121. See course syllabus for description and slide presentation for details.

1.5.2: This is now covered in EDSC237. See updated syllabus.

1.5.3: Covered between CS008 labs and CS121 Lab04. See attached documents for details.

1.7.5: This is now covered in CS110. See updated syllabus.

1.8.2: This is now covered in EDSC237. See updated syllabus.

1.8.3: This is now covered in EDSC237. See updated syllabus

- Need to have a process in place to ensure that standards and endorsement competencies are met going forward. One participant stated that they “hope” that the various curriculum committees remember the CSE standards when approving changes.

Response: The Secondary Education Program is administered by 2 Program Coordinators (UG and MAT) who are responsible for ensuring that standards and endorsement competencies are met for all licensure programs as well as ensuring that endorsement standards are adhered to when courses are added or modified through the Curriculum Affairs Committee (CAC). In addition, all CS courses will list the reference to the appropriate AOE CS standard in the UVM course catalog and requesting that CS faculty list the AOE CS standards on their syllabi. The DOE has an Assessment Coordinator who ensures that ROPA and CAEP standards are being met by individual programs in the Department of Education through an ongoing assessment and evaluation process for accreditation purposes. CSE Website was created to demonstrate evidence that all competencies are being met for CS courses: <https://rerickso.w3.uvm.edu/cse/index.php> and can be readily accessed and referenced when necessary by all CS and Education faculty.

- For MAT candidates, there needs to be a process for transcript review prior to entering the program to ensure all endorsement competencies have been or will be met.

Response: A standard process has been in place to review transcripts for all applicants to the MAT Program that is initiated when a candidate first inquires about the MAT Program. A request for electronic transcripts is made by the MAT Program Coordinator and upon receipt the transcripts are evaluated by matching the candidate’s transcripts with the approved set of courses for the Computer

Science Education major concentration that are aligned to the CS endorsement standards (at least 30 credits of CS coursework). Once the evaluation has been completed, the candidate is notified of deficiencies in coursework that need to be completed for licensure endorsement. Upon acceptance into the program, these outstanding courses are clearly articulated in the acceptance letter with a note that these courses need to be completed in order to be recommended for CS licensure by UVM.

- Indicator 1.3 (endorsement-specific pedagogy) is covered in EDSC 237, but it is unclear where MAT candidates will get this indicator covered.

Response: MAT students enroll in the same EDSC 237 course as the undergraduate students. Therefore, this indicator is covered for all CS education students (MAT and undergraduate).

Consideration(s) for Further Program Development:

- For CS021 Computer Programming, because you reference Modules in the Standards Mapping document, it is recommended that you add an outline of the Modules and content areas included in each and include this within the syllabus.
- Because you reference “weeks” in the Standards Mapping document for CS 110, it is recommended that you add to the syllabus an outline for each week and include content areas covered.
- CS 121 Computer Organization lists “labs” as evidence in the Standards Mapping document but they are not reflected in the syllabus. It is recommended that labs and specific content/titles for each be added to the syllabus.
- Major content areas are noted in the Standards Mapping for 1.5, which directly relate to CS 166 course content. Consider including CS 166 Cybersecurity Principles as a required course for the Minor in order to ensure those competencies related to cybersecurity are covered in the Minor.
- Major content areas are noted in the Standards Mapping for 1.7 within CS 124 Data Structures and Algorithms but the course does not appear to be a requirement for the Minor. Consider including this course in the requirements for the minor as evidence for 1.7.5.
- Consider putting content to meet standards 1.8.2, 1.8.3, and 1.8.5 in EDSC237 and 1.7.5 in CS110.

STANDARD II: Systems of Assessment

Provider uses valid and reliable methods to systematically evaluate candidates' knowledge and performance competencies, to monitor candidates' progress, and to acquire data that is used in making programmatic improvements.

Rating for Standard Two:

Indicators	Evidence	Rating
<p>2.1 – Programs use reliable, valid, and continuous assessment measures to evaluate candidates’ knowledge and performance competencies in relation to the Vermont Core Teaching and/or Core Leadership Standards as well as to the endorsement requirements.</p>	<p>From IP:</p> <p>“Candidates seeking endorsement will participate in each of the EPP’s common assessments. The EPP has done significant work to establish validity and reliability. These assessments include the Professional Attributes and Dispositions Assessment (PADA), the Summative Student Teaching Assessment, the Exit Survey, and Vermont Licensure portfolio. Mentor, Alumni, and Employer Surveys serve to assess candidates’ knowledge following completion of the UVM program. The EPP has also aligned these assessments to the VT Core Standards. See attached descriptions for each assessment. No data are yet available for CSE students; however, they will participate in each of these common assessments and results will be used to identify program strengths, weaknesses and areas for improvement.”</p>	<p>Partial Evidence</p> <p>(The evidence is satisfactory for the Core Teaching Standards but not for the endorsement requirements- see Concern below)</p>
<p>2.2 – Programs ensure that candidates are knowledgeable about the program’s assessment system, including its policies and criteria for entrance to the program, continuing in the program, entrance to student teaching, and exit from the program.</p>	<p>From IP:</p> <p>Evidence as for other programs:</p> <p><u>DOE Policies and Procedures Handbook</u></p> <p><u>Vermont Portfolio (Prior) Data</u></p> <p><u>PADA (Revised) Overview, Data Analysis, and Instrument</u></p> <p><u>Table of Common Entry, Continuation, and Exit Requirements</u></p> <p><u>Candidate Monitoring Warning Letter</u></p> <p><u>SST Protocol and Referral Form</u></p>	<p>Satisfactory</p>
<p>2.3 – Programs regularly and systematically use data from the assessment measures to inform programmatic decisions.</p>	<p>From IP:</p> <ul style="list-style-type: none"> • <u>CSE Assessment System</u> <p>From CSE Assessment System:</p> <p>Essential Data to be collected:</p>	<p>Satisfactory</p>

	<p>Program assessment will include data collection on the number of students enrolling in the minor as well as year of entry and completion of the minor. The CSE coordinator will collect and analyze scores from the EDSC 237 capstone project to identify strengths, challenges, and emerging patterns that may indicate revision to the capstone project and possibly the minor course sequence. The coordinator will collect and analyze program data to assess overall program viability.</p> <p>From interviews:</p> <ul style="list-style-type: none"> • We asked why the statement above referred only to the minor. Per Regina, this was an oversight and will apply to major and minor. • Deans talked about how they would know if the program is successful, including that incoming students to the university would have stronger CS skills, they would draw more candidates both from within the university and outside of it to the program. Also discussed the broader implications of success of this program, including advanced manufacturing, AI, and data work throughout the state. 	
<p>2.4 – Programs have made significant progress toward implementing their Seven-Year Plan and addressing the concerns noted in previous ROPA evaluations.</p>	<p>From IP:</p> <p><u>Progress on Previous 5 year Plans</u></p>	<p>Satisfactory</p>

Commendation(s):

- There is a good process in place to utilize data for program improvement at UVM.
- UVM has made good progress on past goals and concerns.

Concern(s):

- All endorsement competencies are not currently covered through the curriculum; therefore they cannot yet be assessed (2.1).

Response: With the revisions related to endorsement competencies presented in this response to reviewers, we are confident that all endorsement competencies have been addressed and thereby the assessments previously reported on will adequately address valid and reliable methods to systematically evaluate candidates' knowledge and performance competencies, to monitor candidates' progress, and to acquire data that is used in making

programmatic improvements. The EPP assessments are copied here for your reference. These assessments include the Professional Attributes and Dispositions Assessment (PADA), the Summative Student Teaching Assessment, the Exit Survey, and Vermont Licensure portfolio. Mentor, Alumni, and Employer Surveys serve to assess candidates' knowledge following completion of the UVM program. The EPP has also aligned these assessments to the VT Core Standards.

Consideration(s) for Further Program Development:

- None.

STANDARD III: Field Experiences

Provider and its Pre-K partners collaborate to ensure high-quality field experiences where candidates demonstrate effective teaching and take responsibility for student learning.

Rating for Standard 3:

Indicators	Evidence	Rating
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<p>3.1 – Programs collaborate with their field partners to design, implement, and evaluate field experiences to ensure that candidates demonstrate effective teaching and support every student in meeting rigorous learning goals.</p>	<p>From the IP:</p> <ol style="list-style-type: none"> 1. Field experiences related to the CSE Minor and Concentration will utilize the same procedures and quality controls that are currently used for all EPP field experiences, including the Memorandum of Understanding maintained by the Director of Teacher Education. 2. The EPP developed two advisory boards to gain ongoing input from field partners on program preparation, field experiences/student teaching, and assessments used by the program: the FEAC and the EPAC. The attached folder of documents for FEAC and EPAC explains each of these groups and their roles. 3. Mentor teachers supervising students in the CSE Minor and Concentration will contribute to multiple program assessments during various field experiences and student teaching (e.g., PADA and Summative Student Teaching Assessment that is submitted by the university supervisor. 4. The Director of Teacher Education developed a training module for mentor teachers that will be used to orient CSE 	<p>Satisfactory</p>
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	<p>mentor teachers in completing these assessments.</p>	
<p>3.2 – Programs collaborate with their field partners to ensure that candidates understand the expectations of the profession as well as the relevant laws and policies (e.g., school mentoring program, anti-bullying policies, teacher evaluation practices, personal learning plans, and school action plans.)</p>	<p>From IP:</p> <ol style="list-style-type: none"> 1. Syllabi associated with field experiences (e.g., EDSC 209 Practicum in Teaching; EDSC 226 Teaching Internship, and EDSC 230 Teaching for Results) will include information about professional expectations and school policies. The Teaching Methods course, EDSC 237, also addresses professional expectations in the context of Computer Science Education. As noted in the roles and responsibilities sections of the MOU and Clinical Experience Contract, mentor teachers help candidates access information specific to each school site. Candidates will sign a Clinical Experiences Contract when they are in the field to ensure that they are aware of expected behaviors. 2. Field partners will complete the Professional Attributes and Dispositions Assessment (PADA) that evaluates candidates' professional responsibility. In addition, mentor teachers support experiences that allow candidates to complete their Vermont licensure portfolio which assesses professional learning and ethical practice. <p><u>MOU</u></p> <p><u>Clinical Experiences Contract</u></p> <p><u>PADA Overview, Data Analysis, and Instrument</u></p>	<p>Satisfactory</p>

	<p><u>EDSC 226 Syllabus Spring 2018</u></p> <p><u>EDSC 209 - MAT Practicum in Secondary Education</u></p> <p><u>EDSC 230, Syllabus, Spring 2019</u></p> <p><u>EDSC 237 Teaching CS in Secondary School 2020</u></p>	
<p>3.3 –Programs collaborate with their field partners to ensure that candidates know when and how to access resources (e.g., special educators, related service providers and specialists) to address students’ needs.</p>	<p>From IP:</p> <ol style="list-style-type: none"> 1. Field experience courses (EDSC 209, 226 and 230) will provide guidance for candidates in understanding resources available at school sites and how to access these resources. As noted in the MOU, mentor teachers will help candidates access information specific to each school site. 2. Mentor teachers will also support experiences that allow candidates to complete their Vermont licensure portfolio which assesses candidates' ability to access resources to support student needs. <p><u>MOU</u></p> <p><u>Vermont Portfolio (New VLP) Data Analysis</u></p> <p><u>EDSC 226 Syllabus Spring 2018</u></p> <p><u>EDSC 209 - MAT Practicum in Secondary Education</u></p> <p><u>EDSC 230, Syllabus, Spring 2019</u></p>	<p>Satisfactory</p>

<p>3.4 – Candidates complete a sequence of high-quality field experiences that represent the range of grade levels, content, and the requirements of the endorsement.</p>	<p>From the IP:</p> <ol style="list-style-type: none"> 1. A course checklist has been developed to guide students through the CSE Minor and Concentration options. 2. The CSE Curriculum Map indicates how courses address the Computer Science Standards. 3. The CSE Minor and Concentration will develop a handbook to include details about field placements, including quality indicators for experiences across grades 7 – 12 and mentor qualifications. 	<p>Satisfactory</p>
<p>3.5 – Programs provide candidates with a variety of high-quality field experiences with a diverse population of students and educators.</p>	<p>From IP:</p> <ol style="list-style-type: none"> 1. The EPP has developed a field placement tracking system to use with our field experience and student teaching modules in our data management system (Tk20). Each placement is categorized by grade level and prek-12 student demographics. School districts to be utilized for CSE placements will be categorized based on socioeconomic status, English language learners, students with special needs, students of color, and non-promotional mobility. 	<p>Satisfactory</p>

Commendation(s):

- The Education Department has created a commendable connection between the department and cooperating teachers, including standard forms, handbooks, webinars, and others.
- Both CS faculty members who are participating in the start-up of this program and who will teach some of the courses are active in P-12 education and understand the applications in the school systems.

Concern(s):

- Field partners need to be developed for Computer Science Educator placements.
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Response: The earliest that we will require Computer Science mentors for secondary education interns will be in the 2021-22 academic year. We are investigating schools in northern Vermont that have full-time or part-time CS teachers. Once identified, the Director of Teacher Education will send out an official inquiry and request for CS teachers to partner with CESS as CS mentors for our interns. We are aware that Burlington HS, one of long-standing school partners, has a search open for a full-time CS teacher.

Consideration(s) for Further Program Development:

STANDARD IV: Resources and Practices

Provider ensures that programs and candidates have the resources to meet Vermont's Core Teaching and/or Core Leadership Standards as well as the endorsement requirements.

Rating for Standard 4:

Indicators	Evidence	Rating
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<p>4.1 – Provider’s policies and resources support faculty in scholarship, service, and teaching as well as in their efforts to collaborate with colleagues across the institution and in the field.</p>	<p>From IP:</p> <p>1. Faculty negotiate a workload each year with their department chair and dean that includes specific percentages of their load allocated to teaching, research, and service. The attached Faculty Workload Guidelines were developed in December, 2019 and are under review. They scheduled for implementation in Fall, 2020.</p> <p>2. The university and college provide guidelines for expectations for faculty for reappointment, promotion, and tenure. Collaboration with colleagues at the institution and in the field is encouraged and rewarded in the RPT process. The CESS RPT guidelines are currently undergoing review and revision.</p> <p><u>CESS Faculty Workload Guidelines</u></p> <p><u>Reappointment, Promotio</u></p> <p>Evidence from Interviews:</p> <p>Interview with deans from CESS and CSMS (?) depts (Scott Thomas and Linda Schadler:</p>	<p>Exemplary</p>
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	<p>Both expressed support for the program on an ongoing basis. “Durable leading program” - program for the future so whatever happens it will continue to be well-resourced.</p> <p>Grant was given to support this program- specifically the collaboration between the departments for program implementation. \$60K across two years.</p> <p>Interview with large group:</p> <p>Collaboration with field includes CS Ed Collaborative- Regina started that group when recognizing C.S. education as a gap in their program. Includes Juniper Novato from C.S. Dept., Sarah Fergus (?) from CS Dept, Peter Drescher from AOE. Had a summit last summer for classroom teachers around the state- brought in a consultant from N.M. 40 teachers attended. Other collaboration with field is John Collin from IBM/MIT and Donna Rizzo- I believe from UVM- engineer with deep C.S. background. They are part of the team writing the CS For All NSF grant.</p>	
<p>4.2 – Programs have the leadership, authority, budget, personnel, facilities, and technology necessary to meet approval standards and indicators.</p>	<p>From Interviews:</p> <p>Best CS Lecturers stepped up and have been working very collaboratively with the Ed department to create the program.</p> <p>Dean Schadler discussed the recent heavy investments by UVM in CS Ed: new building and tech resources.</p>	<p>Satisfactory</p>
<p>4.3 – Provider and programs recruit, admit, support, and retain candidates, faculty and cooperating teachers from diverse backgrounds.</p>	<p>Evidence is available from the ROPA review conducted in 2018.</p> <p>From prior ROPA review IP:</p> <p>Per IP:</p> <ol style="list-style-type: none"> 1. <u>Recruitment of Diverse Candidates</u> 2. <u>CESS Student Recruitment Plan</u> 	<p>Satisfactory</p>

	<p>3. <u>CESS Diversity Recruitment and Retention for Faculty and Staff</u></p> <p>4. <u>University Diversity Recruitment Plan</u></p>	
<p>4.4 – Provider demonstrates an overall effort to address community, local, regional, state and national needs for hard-to-staff schools and fields of teacher shortage.</p>	<p>Deans discussed broader implications of CSED in the state- UVM’s land grant responsibilities to meet the needs of the state- including areas of advanced manufacturing, AI, data analysis- for education and other areas.</p> <p>Deans stated that part of the success of the program would come from Vermont students coming to UVM with stronger CS skills.</p> <p>Deans stated that success is drawing candidates to ensure enough CS educators in the state, and asking SUs/SDs if they have enough CS educators in their districts. If they are not drawing candidates, committed to figuring out where the disconnect is.</p>	<p>Exemplary</p>

Commendation(s):

- Accessing grant resources for professional development in support of faculty collaboration was essential to providing for program development. Both the Department of Education and the Department of Computer Science are strongly supporting this program, including a two year \$60K grant for program development, and sabbatical time for the Secondary STEM Coordinator. Everyone we talked to was enthusiastic and mentioned that this process of working between both departments was an exceptionally enjoyable and collaborative experience.
- The process for creating the program has been deliberate and sustained over a two-year period leading up to rollout, and has included collaboration with the field as well as internally..
- There is a high level of administrative support for sustainability of the new program, given the current needs of delivery of education in innovative modalities and remote locations.
- UVM is taking the lead in developing a program that should support K-12 education in Vermont going forward.

Concern(s):

- None

Consideration(s) for Further Program Development:

- We recommend that UVM create a position to oversee the program, including monitoring continued standards compliance.