Spectrum Innovates Pathway Program: Preparing Autistics to Enter Higher Education

And Careers in Advanced Technological Fields: Overview, Framework & Curriculum

Waters, Patrick, M.ed

Chaifan, Hope

Alba, Samantha,

Bednarsh, Eleanore

Spectrum Innovates, Inc.

Author Note

Samantha Alba is now of

Eleanore Bednarsh is now of

Correspondence regarding this article should be addressed to Patrick Waters, Spectrum

Innovates, Inc. United States. E-mail: pwaters@spectruminnovates.org

Abstract

To address the autistic community's employment crisis and the forecast shortage of technicians in the aeronautics industry over the next twenty years, nfpNEXUS, Inc. will develop and implement Spectrum Innovates Pathway Program (SIPP). SIPP, a prototypal transition pathway program for those on the autism spectrum who share a common passion for aeronautics. The primary goals of the SIPP program are to prepare students to succeed in higher education and enter the workforce in advanced technician roles. Our partner in this initiative is Vaughn College of Aeronautics and Technology, Inc. (Vaughn), whose vision is to change the world one student at a time with a transformational education that creates a lifetime of opportunity.

Template for APA 6 styled manuscript

This document includes several levels of headings. Type the heading text, then select the appropriate level from the Styles drop-down menu on the toolbar.

Heading 1: Bold, Centred (Manuscript or Section Title)

Heading 2: Bold, Left-Aligned (Section Title)

Heading 3: Bold, left-aligned, indented, ends with a full stop (Sub-section title).

Heading 4: Bold, left-aligned, indented, italicised, ends with a full stop.

Heading 5: Left-aligned, indented, italicised, ends with a full stop.

An important note about headings

Headings 3, 4 and 5 are usually in-line headings. That is, they immediately precede the paragraph text instead of sitting on their own line. Unfortunately it is not possible to create a style like this in Google Docs. This can create problems when copying and pasting or exporting the text into Word. There is no current way to avoid this issue with inline headings.

Figures and tables

Tables and figures can be copy-pasted into the document, but I recommend that they are edited separately and included only at the end of the process. Table formatting tools are very basic (e.g., you are unable to merge cells or have only horizontal, APA-style borders) and managing cell alignment and sizing is an exercise in frustration. Figures look best when pasted as images, not shapes (as might be created in Microsoft Office). You can create basic figures with Insert >> Drawing if necessary.

References

I recommend Paperpile, a reference manager that integrates with Google Scholar and Docs. It works similarly to the Endnote/Papers plug-ins for Word, but simpler and better.

SIPP Table of Contents

Project Description

Results from Prior NSF Support
No prior NSF support has been granted to nfpNEXUS, Inc., nor are there any submitted grant applications awaiting approval.

Introduction
This Advanced Technological Education proposal is submitted by nfpNEXUS, Inc. (NEXUS), a 501(c)(3) organization, whose mission is to maximize the potential of autistic individuals through innovative programs and initiatives.

Project Overview
To address the autistic community's employment crisis and the forecast shortage of technicians in the aeronautics industry over the next twenty years, nfpNEXUS, Inc. will develop and implement Spectrum Innovates Pathway Program (SIPP). SIPP, a prototypal transition pathway program for those on the autism spectrum who share a common passion for aeronautics. The primary goals of the SIPP program are to prepare students to succeed in higher education and enter the workforce in advanced technician roles. Our partner in this initiative is Vaughn College of Aeronautics and Technology, Inc. (Vaughn), whose vision is to change the world one student at a time with a transformational education that creates a lifetime of opportunity.

Motivating Rationale
The CDC reported in April 2018 that 1 in 59 children born in the US continue to be diagnosed with autism spectrum disorder (ASD) (CDC, 2019). 500,000+ individuals with ASD will age into adulthood over the next 10 years (Roux, Shattuck, Rast, Rava, & Anderson, 2015). Autism Speaks currently reports that the vast majority of autistics are unemployed or underemployed, with estimates ranging to as high as 90% (Autism Speaks,

n.d.). These statistics represent an immediate US employment and societal crisis (Gerhardt & Lainer, 2011).

Transition, the move into higher education, the workforce and adult independence, is the single greatest challenge facing the autistic community. Transition is especially difficult for autistics, given the developmental, communicative and social deficits that are characteristic of autism. Compounding these challenges, between 18 and 22 years of age, ASD students age out of service governed by the IDEA, and the social welfare laws mandating specialized services end abruptly — "falling off the cliff"— destabilizing their lives. Families are further overwhelmed and left scrambling to find programs for their children that lead to employment. Existing programs are based on a deficit model rather than capitalizing on strengths and do not facilitate the development of essential social emotional and life skills requisite for sustained competitive employment (Koenig & Williams, 2017) (Fletcher-Watson & Happé, 2019).

Corporate leaders have identified the autistic community as having unique untapped talents, skills and creativity. Microsoft, Ford, SAP, DXC, and JPMorgan Chase, members of the Autism at Work consortium, affirm that companies that can effectively tap into this talent pipeline will hold a competitive advantage.

Airlines, manufacturers of airplanes like Boeing and aircraft engine-makers such as General Electric, are racing to ensure a pipeline of maintenance technicians to fix and maintain their aircraft as a wave of current employees approach retirement (Josephs, 2018). The aviation industry forecasts the need for 769,000 new highly skilled technicians globally over the next

20 years with over 193,000 in North America alone (Boeing, 2019). This represent a $2.4 trillion job market over 20 years, the largest segment of growth in aviation (Airbus, 2019). They have recognized training, retirements, technology advancements and competition for talent as the challenge for attracting and retaining talent. To address the challenge significant recruiting efforts will be applied to attract people to the industry and hiring practices will be adapted to use competency-based certification to fill positions.

The key to preparing autistics as technicians for high-tech fields and therefore our goal is the development of transition programs that employ their strengths (Koenig & Williams, 2017) to advance technical and academic learning, while concurrently developing essential social, practical and business skills. Merging these essential components leads them to work and live productively and independently as required in today's job market.

Intellectual Merit
This project has the potential to transform education for autistics. At SIPP's core is the full immersion of autistics in a STEM learning environment as the means for them to acquire the knowledge and certifications for their entry into advanced technical careers. The development of SIPP is informed by the findings of the National Academies of Sciences, Engineering, and Medicine (2018) on best practices for learning. For over three decades, education for autistics has been based on a Theory of Mind model that resulted in a monolithic view of the capabilities of autistics with particular regard to cognition and empathy (Baron-Cohen, Leslie, & Frith, 1985). More recent research has led to modified models as well as the emergence of new cognitive models for autism (Klin, Jones, Schultz, & Volkmar, 2003). The continued evolution of these models reflects a more comprehensive understanding of how empathy and cognition manifest among autistics (Fletcher-Watson & Happé, 2019). SIPP

translates this current research into practice in the design of an educational program that prepares students to succeed in higher education and enter the workforce. The program also responds to recent calls for research on the positive effects of engaging special areas of interests (SAI) for individuals with autism spectrum disorder (ASD) in school and workplace settings, and builds on current research by utilizing SAIs as strengths in interventions designed for autistics (Sun San Wong, 2018) (Koenig & Williams, 2017).

Broader Impacts
Many autistics have exceptional abilities that if validated and cultivated would allow them to flourish and contribute to society (Hillier et al., 2007). While some navigate the transition into post-secondary education, employment and adult independence, this is not the case for most with ASD. Demand for programs and services to assist with transition far exceeds availability (Volkmar, Jackson, & Hart, 2017). Almost invariably, the potential of autistics becomes a lost opportunity, and the consequences are pervasive and growing. ASD-related medical, nonmedical and productivity losses are forecast to be $461 billion for 2025. The researchers noted that these estimates could reach $1 trillion by 2025 if ASD prevalence continues to increase as it has in recent years (Leigh & Du, 2015).

The project employs a robust recruitment process for students that will increase awareness of the availability of the advanced technician options for autistics. Industry partners serve a dual role as advisors on emergent work force skills as well as identifying and promoting opportunities for autistics in the job market.

Project results will be shared in a fully transparent manner consistent with NSF guidelines. To further the propagation of what is learned in the development, implementation and

evaluation of the project, outreach will include conferences, workshops, and consultancy. As a direct result of these outreach efforts, educators, service providers, industry professionals and the wider community will gain a direct understanding of the Spectrum Innovates Pathway Program model and the benefits it can have for individuals with autism spectrum disorder and the aeronautics industry (Wei, Yu, Shattuck, McCracken, & Blackorby, 2013).

GOAL, OBJECTIVES, DELIVERABLES & ACTIVITIES
Goal
The goal of the SIPP program is to prepare students to succeed in higher education and enter the workforce in advanced technician roles.

Table of Objectives and Activities

#	Objective	Activities
1	**Provide a strength based immersive, integrated, interdisciplinary curriculum responsive to the autistic learner and based upon industry standards for competency based certification.**	**1.1. Create a Scaffolding** **1.1.1. academic** **1.1.2. social emotional infusion** **1.1.3. life skills** **1.2. Create Innovation Hub** **1.2.1. industry based projects** **1.2.2. simulations** **1.3. Design 12 month curriculum** **1.3.1. six week orientation** **1.3.2. two semesters** **1.3.3. six week residency** **1.4. Student Evaluations (See activities objective 3)**
2	**Revision or creation of 3 courses totaling 12 credits incorporating SIPP pedagogy**	**2.1New Aeronautics Canvas course (6 credits)** **2.2Revised Pre-Calculus course (3 credits)** **2.3Revised English course (3 credits)**
3	**Design student assessment and evaluation system**	**3.1. Benchmarks** **3.2. Badges** **3.3. Certificate3.4. Feedback loop**
4	**To create a comprehensive plan for admission and exmission for students**	**1.1. Admissions** **1.1.1. development of materials for prospective students** **1.1.2. placement officers** **1.1.3. events**

		1.1.4. assess applicants and create cohort **1.2. Exmissions** **1.2.1. design exit survey** **1.2.2. cultivate relationships with industry and other educational institutions** **1.2.3. longitudinal tracking of alums**

Program Overview

The Spectrum Innovates Pathway Program (SIPP) is a bridge year for autistic students who have completed their high school requirements. Working in the Innovation Hub (IH) immersed in the experiential learning process, students acclimate to the collegiate and work environment and develop critical life and practical skills facilitating the unlocking of their fullest potential (Scott et al., 2019). Projects designed to model real world challenges reinforce existing knowledge and skills while fostering their further development.

This program runs for 12 months with a 6-week orientation, two academic semesters and culminates with a 6-week residency experience. Semesters consist of fifteen 30-hour weeks composed of 6 hours of blended classroom instruction and 24 hours in the Innovation Hub. Students will be in a cohort for the duration of the program, creating a supportive learning environment.

The Innovation Hub

The Innovation Hub resides at the center of the Spectrum Innovates Pathway Program. The IH informs and drives the program and methodology. Physically comprised of Maker Space, Composite Prototyping Center, Robotics Lab, Flight Simulators and Air Traffic Control Simulators, the IH provides the space and tools for immersive and experiential learning that reinforce and build upon knowledge acquired and generates new knowledge. In addition to its physical assets the IH is imbued with a professional, collaborative, safe, affirming

atmosphere that improves self-regulation, workplace behaviors and increases productivity (Scott et al., 2019).

Soft Skills

Deficits in executive functioning and social communication, referred to as "soft skills," are identified as major challenges to employment success for adults with ASD (Baker-Ericzen et al., 2017). SIPP addresses soft skills both directly and indirectly. The skills of problem solving, goal oriented thinking, asking for help and self-advocacy are infused, explicitly practiced and applied as part of the work in the Innovation Hub and classroom. Skills such as self-regulation, context awareness, perspective taking, collaboration and communication emerge and are utilized as a natural consequence of engaging in work in the IH environment (Martin, Vidiksis, & Koenig, 2019) (Waters, 2016). Preparation and delivery of oral presentations are incorporated throughout the program.

Orientation

During the first 6 weeks of the program, workshops and maker activities set the stage for collaboration and communication. Students become familiar with faculty, other students, facilities and safety rules and regulations. Workshops give students the chance to explore the Maker environment and to engage in a wide range of projects and design challenges. Students enhance their social and technical problem-solving skills through interaction and collaboration with peers, mentors and facilitators and experience the camaraderie and creativity inherent in Making. With mentoring and support students work within unifying, theme-driven parameters based on their specific area of interest (SAI) and participate in daily reflection and sharing about their decision making, goal setting and problem solving processes. In this time faculty identify students' strengths and deficits in practical skills necessary to perform future project tasks and remediate as needed.

Academics

SIPP's project-based, experiential learning model drives the three academic courses required by the program. Pre-Calculus is a pre-requisite for advancement into all areas of technical certification as well as satisfying a core curriculum requirement in higher education degree programs. SIPP staff co-teach this revised course as a hybrid online/in class course. Time working hands-on in the Innovation Hub on real world challenges manifests concepts of mathematics as intrinsic to aeronautics and engineering.

In the first semester of a new yearlong Canvas course students sample the wide range of opportunities for study and employment in the aeronautics field. Semester two provides deeper exploration of topics and offers the opportunity to learn about ones particular area of interest. The course is led by faculty field experts and complemented by the contributions of industry guest speakers and Vaughn student mentors. This interdisciplinary course integrates competency acquisition across the SIPP curriculum. Learning experiences occur in and outside of the Innovation Hub and include fieldwork, simulations, experimentation, design challenges and research.

English Composition (revised) is fundamental to effective communication in business and frequently a challenge for autistics. The use of written communication in the acquisition of a job, to share information, ideas and questions is critical to career advancement. While development of communication skills is interwoven throughout the program, the composition course is an opportunity to focus on the elements of written communication. English Composition assignments are designed to complement the second semester of the Canvas course as well as provide practice in written communication related to Innovation Hub projects.

Residency and Final Project

Upon conclusion of the second academic semester students enter the 6-week residency program, living on campus at Vaughn. Social-emotional and life skills developed throughout the program are applied while students engage in independent living, many for the first time. This supervised living experience gives students the opportunity to live away from home in preparation for college and adult independence. While in residence at Vaughn they will draw on the entirety of knowledge and skills they have internalized throughout the year to conceptualize, design, and execute an industry relevant project galvanized by their SAIs.

Student Assessment

Spectrum Innovates Pathway Program is a credit bearing certificate program. Student achievement is evaluated by performance assessments that determine competency. Outcomes are assessed throughout the program's implementation using novel and existing instruments for formative, ongoing and summative purposes. These instruments combined with observational assessments denote the achievement of benchmarks and provide real time feedback. Student engagement in this feedback loop ensures understanding and retention of the concepts and skills needed to achieve the desired competency. A virtual badge is awarded for each competency that is achieved. Requirements for competencies and their representative badges (Yowell, 2018) are developed in concert with industry's emerging needs and Vaughn's competency requirements for degree programs. Students must acquire the requisite badges that represent an array of essential and highly valued skills and concepts in order to receive a credit-bearing certificate upon completion of the program.

Admissions & Exmissions

The program is for those on the autism spectrum who have completed their high school requirements and share a common passion for aeronautics. In order to create a cohort of 20

individuals who have the skill sets complementary to SIPP requires the use of multiple methods of assessment. These will include an array of standardized measures to assess executive function and social communications skills as well as novel methods of assessment that will be created to ascertain applicants' interest alignment with SIPP.

Outreach focus will be to NYC, Westchester, Long Island, Eastern NJ public and private schools, autism advocacy groups, service providers, placement consultants and clinical centers. We will do presentations for interested groups subject to availability. Open house recruiting events will be held at Vaughn between September and January each year.

Exmissions
Positive student outcomes will be defined as the pursuit of higher education and / or securing employment in advanced technician roles. Students receive 12 transferable college credits and are eligible for fast-track admission to Vaughn upon completion of SIPP's competency requirements and award of certificate. Students who enter Vaughn via SIPP receive the same extensive career and job placement benefits extended to all Vaughn students as well as a dedicated placement program for those on spectrum.

In their role as a partner in this project Vaughn will facilitate introductions and outreach to industry partners including those who serve on their Industry Advisory Council. The cultivation of relationships with industry leaders will advance the prospects for autistics in pursuit of aeronautics careers.

Establishing connections with other educational institutions serves a dual purpose, it allows us to guide our students and advocate for their acceptance into other institutions and provides collegial relationships to further mutual goals.

EVALUATION PLAN

External Evaluator
External evaluation of the project will be handled by the Office of Assessment and Analytics at Southern Connecticut State University. Evaluation will be led by Scott Luther James Jackson, PhD., Director, Office of Assessment and Analytics, Southern Connecticut State University, Clinical Instructor, Child Study Center, Yale School of Medicine. Dr. Jackson has conducted research and authored multiple scholarly articles on autism funded by NIH and others, including the following recent publications that are highly relevant to the aims of the proposed project: Self-reported Academic, Social, and Mental Health Experiences of Post-Secondary Students with Autism Spectrum Disorder (Jackson, Hart, Brown, & Volkmar, 2018)Transition Issues and Challenges for Youth with Autism Spectrum Disorders (Volkmar et al., 2017). His expertise as an evaluator and body of work in the field of autism as a researcher and clinician uniquely qualify him to evaluate the project. The evaluation is being conducted under the auspices of SCSU office of Sponsored Activities and Research, which will also be handling the IRB for the project.

The continual evaluation of the students and the curriculum will be used to inform decisions on how to improve and revise SIPP processes and will drive the ongoing success of the program.

Evaluation Timeline

During the curriculum development period in the first year of the grant the External Evaluator will meet with the PIs, curriculum development team and members of Vaughn faculty four times to review the process and content of the work in progress. (May, Aug, Dec 2020, Apr 2021)

Throughout the remaining lifecycle of the grant, project PIs will conduct internal review of all data collected by their collectors, faculty and staff at the intervals outlined in the Evaluation Questions section below for quality assurance. The data, all underlying supporting documents and personnel will be available to the External Evaluator. The External Evaluator will review/analyze the data collected and meet with the PI and other staff. (Sept, Dec 2021; Mar, Jul, Oct 2022; January, May 2023) and prepare required NSF reports annually.

Evaluation Questions
Our evaluation questions further existing research in the areas of intervention, education, and preparation for autistics entering the workforce for the purpose of improving outcomes and increasing the efficacy of the program.

1) Does the program methodology result in the acquisition of the required competencies by students?
Progress toward achieving the competencies required to receive a credit-bearing certificate is measured through formative, ongoing and summative assessments. Students demonstrate growth of concepts and skills that is measured against both program and personal benchmarks. Both existing and novel instruments developed as part of the curriculum design are employed to determine when a competency is achieved. All student evaluation in this program is derived from and is consistent with competency based program methodology. Details on the efficacy of program methodology is informed by data analysis related to the

acquisition of required competencies. All students are expected to complete competency requirements within the 12 months. As the time of badge achievement is variable for each student data collection is continuous throughout the duration of the students participation in the program.

2) What is the impact of integrating Social Emotional Learning and life skill components into an advanced technology educational program for autistic students?
Two components will be examined:

a)   Frequency of engagement in the cognitive and social communication functions of goal-oriented thinking, problem solving, collaborating, self-advocacy and asking for help will be collected through the running record checklist observation. Recorded several times a quarter and tabulated quarterly. Standardized instruments such as the BRIEF, SRS-2 and Scales of Independent Behavior will also be utilized to capture these attributes.

b)   Acclimation to the SIPP learning environment in multiple setting/activities (McDonough & Revell, 2010) will be measured over time through a 1 to 5 scale utilizing self-reporting (Mueller, Gaus, & Rech, 2014) and faculty observation. Recorded at the beginning and end of the 6-week orientation, mid-first semester and end, mid-second semester and end. Reviewed mid-August, end of first semester and end of second semester.

3) What are the employment and educational outcomes for students who complete the program?
Outcomes are measured longitudinally by students' success in pursuing higher education and / or securing and sustaining competitive employment. Education and employment participation data will be collected from individuals when they exit the program, and at six months, one-year and three-years after exiting the program. The collected data will include:

- **Employment** - employer, position, level of employment, time in position, job satisfaction, periods of involuntary unemployment.

- **Education** - program (certificate, degree or other continuing education), area of study, estimated completion date and future study plans.

- Did the program contribute to the students continued education or employment and if so, how?

This data will be obtained through a combination of online surveys and interviews at the designated times and used to determine the level of program efficacy and assist in identifying any areas of the program to be modified.

4) How do SIPP student outcomes compare to those of control groups?
a)   Changes in SIPP students' cognitive and social communication function will be compared to those of our waitlisted applicants. SIPP students and a control group comprised of SIPP waitlisted individuals will be administered standardized assessments during the admissions process. Subsequently, SIPP students will repeat the assessment at the end of the program. Those waitlisted will repeat the assessment in the same time frame as SIPP students.

b)   The performance of SIPP students who take the revised Pre-Calculus and English Composition that incorporate the Innovation Hub and strength-based approach will be compared to the performance of Vaughn neurotypical students in the unrevised Pre-Calculus and English Composition courses. Data on course topics as well as the final grades (converted from competency using Vaughn's established method) will be collected upon completion of Pre-Calculus (December 2021) and English Composition (May 2022).

c)   Educational/employment outcomes of SIPP students will be compared to reported national ASD statistics. Collection of SIPP alumni data is performed as part of Question 3.

DISSEMINATION PLAN

It is nfpNEXUS' policy to share the results of all research and project endeavors. In addition to posting results and ongoing project activity on our website, we will openly disseminate results of our program utilizing our outlet network. Autism Speaks, who has been following our progress in bringing this program forward, will announce its availability through its communications network. Other outlets include STEMConnector, Autisim Spectrum News, Education Update, The Child Study Center, Yale School of Medicine and Center for Autism and the Developing Brain at NewYork-Presbyterian. To further the propagation of the projects results, outreach will include conferences, workshops, and consultancy. As a direct result of these outreach efforts, educators, service providers, industry professionals and the wider community will gain a direct understanding of the Spectrum Innovates Pathway Program model.

MANAGEMENT PLAN ROLES AND RESPONSIBILITIES

Achievement of the project goal requires a team consisting of highly qualified educators with extensive experience in bringing all aspects of STEM curriculum design from concept through implementation, evaluation and revision. Over the past three years, PIs Bednarsh, Chafiaan and Waters produced and directed NEXUS' Spectrum Innovates Workshops where ASD participants conceived designed and produced STEM project. Co-PI Lavergne provides expertise in collegiate aeronautics, engineering and mathematics curricula and bridges integration of SIPP with Vaughn's curriculum.

PI and Project Director Eleanore Bednarsh is Director of Programs at nfpNEXUS. Among her long list of qualifications she has served as a charter school founding director (managing $2.4 M annual budget), educational consultant, curriculum developer, administrator, project

manager, teacher trainer and educator in the private and public school systems and created

and managed strategic plans. In addition, Bednarsh served as a member of the New York

State Accreditation Evaluation Team, New York State Association of Independent Schools

and worked on project management of publications and editorial services for non-profit

organizations. Her breadth of experience makes her an ideal choice as PI and leader of the

team. She will actively work on all aspects of the project goal and objectives. She will act as

lead interface to NSF during the life of the project and be responsible for the execution of the

project plan and reporting to NSF per the grant guidelines.

Bednarsh will utilize the Asana project management system to plan, assign tasks and track

and review progress.

Co-PI Hope Chafiian served 20+ years as Director of Technology and Curriculum at The

Spence School, NYC. Her expertise and experience in physical computing, developing

curriculum in emerging technologies, curriculum design and integration, and education

combined with her leadership roles as a board member of the Logo Foundation and founding

member for Robo-Expo NYC is highly applicable to the project's goal. Along with being a

member of the curriculum development and academic course revision team, she will devise

competency assessments, assist with the development of the admissions plan and provide the

added support needed for the PI to manage the implementation of the project. (Objectives 1,

2, 3 & 4)

Co-PI Paul LaVergne, PhD is the Vice President of Academic Affairs at our partner

institution Vaughn College of Aeronautics and Technology. He provides content expertise in

aeronautics, mathematics and engineering components for SIPP. LaVergne serves as a curriculum developer on the project and is responsible for oversight of revision of two Vaughn courses and creation of new Canvas course. He will collaborate on aligning Vaughn's student evaluation system with SIPP's competency badges. (Objectives 1, 2 & 3) As a member of our partner institution's senior administrative team Paul is the faculty coordinator between Vaughn and SIPP.

Co-PI Patrick Waters is an educator who pioneered the use of STEM/Maker curriculum with autistic students at the Monarch School in Houston, Texas. He has spoken at national conferences and published on the role of STEM/Maker for Autistics (Waters, 2016) (Waters, 2014). He founded STEAMworks, a Houston, Texas makerspace designed for students with neurological differences. Waters' experience provides unique insight into the creation and development of the Innovation Hub at the core of the project. His expertise in developing innovative experiential curricula for those with ASD is invaluable to advancing the project. Additionally, as a member to a member of the curriculum development team Waters serves as a STEM advisor on competency assessment, revision of academic courses, and the admissions process. (Objectives 1, 2, 3 & 4)

Vaughn College's finance office will assure all financial expenditures are within the NSF guidelines. All curriculum changes will pass through the college curriculum process. NEXUS and Vaughn's Network Services Department has the capability to provide website and technical support. Southern Connecticut State University's office of Sponsored Activities and Research IRB committee will review the proposal if it is successful.

PROJECT TIMELINE

May-20	Begin SIPP Curriculum Work
	Meet with External Evaluator
Aug-20	Meet with External Evaluator
Sep-20	Establish Admissions Team
	Develop Admissions Materials
Sep-Dec 20	SIPP Open House at Vaughn
Oct-20	Begin HS & Community Outreach
Nov-20	Admission Evaluation Tools Complete
Nov-Dec 20	Admission Meet & Greet with prospective students & families (on/off campus)
Dec-20	Meet with External Evaluator
	Begin Scheduling Individual Admission Evaluations
Jan-21	Begin Individual Admission Evaluations
	NSF Report Due 1/31
Feb-21	Completed Application Deadline 2/12
Mar-21	Individual Admission Evaluations End 3/12
	Admissions Committee Meets
Apr-21	SIPP Curriculum Work Complete (Objective 1, 2 & 3 Met)
	Meet with External Evaluator
	Admissions Committee Meets
	Notification of Acceptance Sent 4/12
May-21	Enrollment Contract & Tuition Due 5/1
Jul-21	SIPP Orientation Begins
Aug-21	1st Academic Semester – Pre-Calculus, Canvas Part I
	Student Orientation Evaluations Due
Sep-21	Meet with External Evaluator
Oct-21	Begin HS & Community Outreach
Sep-Dec 21	SIPP Open House at Vaughn
Nov-Dec 21	Admission Meet & Greet with prospective students & families (on/off campus)
Dec-21	Meet with External Evaluator
	Begin Scheduling Individual Admission Evaluations
	First Academic Semester Ends
	First Semester Student Evaluations Due
	Begin Exmissions Counseling - Ongoing
Jan-22	2nd Academic Semester – English Comp, Canvas Part II
	NSF Report Due 1/31
Feb-22	Completed Application Deadline 2/11
Mar-22	Individual Admission Evaluations End 3/11
	Admissions Committee Meets

	Meet with External Evaluator
Apr-22	Admissions Committee Meets
	Notification of Acceptance Sent 4/11
	Enrollment Contract & Tuition Due 4/30
May-22	Second Academic Semester Ends
	Second Semester Student Evaluations Due
May-Jun-22	Final Project & Residency Experience 6-Weeks
Jun-22	Exit Survey (Objective 4 Met)
Jul-22	SIPP Orientation Begins 7/11 – 8/19
	Final Student Evaluations Due
	Meet with External Evaluator
Aug-22	1st Academic Semester – Pre-Calculus, Canvas Part I
Oct-22	Meet with External Evaluator
	Begin HS & Community Outreach
Sep-Dec 22	SIPP Open House at Vaughn
Nov-Dec 22	Admission Meet & Greet with prospective students & families (on/off campus)
Dec-22	Begin Scheduling Individual Admission Evaluations
	First Academic Semester Ends
	First Semester Student Evaluations Due
Jan-23	2nd Academic Semester – English Comp, Canvas Part II
	Meet with External Evaluator
	NSF Report Due 1/31
Feb-23	Completed Application Deadline TBD
Mar-23	Individual Admission Evaluations End TBD
	Admissions Committee Meets
Apr-23	Admissions Committee Meets
	Notification of Acceptance Sent TBD
	Enrollment Contract & Tuition Due TBD
May-23	Second Academic Semester Ends
	Second Semester Student Evaluations Due
	Meet with External Evaluator
May-Jun-23	Final Project & Residency Experience 6-Weeks
Jun-23	Exit Survey
	Goal Met

SUSTAINABILITY

Due to this project requiring complete development of multiple original components and revision of two existing courses, more than 75% of the requested project's costs reflect development and initial implementation and occur within the first three years of the grant and are non-recurring. Financial sustainability after the first three years of the grant is limited to discrete line items for increased staffing and direct costs that are solely attributable to the addition of this program to NEXUS' and Vaughn's normal continuing operations. It is anticipated that at the end of the grant cycle, tuition combined with results from fundraising efforts will fully fund the program's continuation.

Delivery of SIPP is fully supported at the highest level by the efforts of NEXUS and the president of Vaughn College, Dr. Sharon DeVivo. NEXUS and Vaughn College in partnership are committed to sustaining the efforts of this project through regular curriculum updates, increased course revisions, faculty development, community outreach, new grant funding and subsidized student tuition. Vaughn has committed to facility and resource availability and faculty and administrative release time during the lifetime of the program and will support class offerings with capped enrollments while these new courses are developed. Additionally, Vaughn has committed to the hiring of faculty and staff experienced in working with those with ASD to support their education at and after Vaughn and assist with future job placement.

NEXUS and Vaughn will actively seek grants from private and public sources to subsidize further development and support of the program as well as scholarships and sliding scale tuition for qualified students. Fundraising efforts will include establishment of an annual fund, industry and corporate sponsorship, major gifts, and employer-based arrangements.

To ensure sustainability and continued relevance of the program, Vaughn and NEXUS will engage with researchers and industry to keep curriculum content current and aligned with industry's emerging needs and best practices.

ASN Media Presentation

Transition for Autistic Youth:

Single Greatest Challenge Facing the Autistic Community

Aging out of School System

Over the next decade, nearly **1,000,000** autistic individuals will age out of the school system. (CDC)

85% Unemployment Rate

The combined unemployment and underemployment rate for adults with autism is estimated at 85% nationwide (Roux at al., 2017).

Few Transition Programs

There are not enough transition programs to meet current needs.

SIPP Students Meet The Needs of Tomorrow's Economy

Flexible

The World Economic Forum predicts significant disruption in the jobs landscape over the next four years

Highly Skilled

Nearly all jobs will change into "superjobs," an emerging job category that will require high levels of human skills

Cross-Disciplinary

Problem-solving, coding, critical thinking, knowledge of computers, communication, interpretation, and design

SIPP Education Goals & Program Tenets

Immersion in process
and tools of innovation

Acquisition of Advanced
Technological skills

Leadership & Advocacy

Social-Emotional Support
and Development

Life Skills Training and
Practice

A New Model
Project-based, experiential learning model

- Immersive maker environment
- Integrated Social-Emotional Learning in maker, campus and academic settings
- Special Areas of Interest (SAI) or Passion-based cohorts
- Orient to strengths, not deficits
- Program responsive to individual profile
- Competency-based evaluation & badging system
- Research based design and results
- Model is replicable and adaptable to other academic areas

Innovation Hub
Project-Based Learning

Innovation Hub and Social-Emotional Learning Integration

Experiential Learning Challanges

Design process

SEL skills emerge in Innovation Hub

Feedback loop

Integrated Social-Emotional Learning

SEL Skills

Role play
Innovation Hub challenges
Classroom

Journaling

Reflections
Strategies & worksheets
Apply outside of SIPP

CASEL & AET

Self-awareness
Self-regulation
Communication
Emotional understanding
Sensory processing

Feedback Loop

Instructor
Peer
Self-monitors own learning

Social-Emotional Learning Frameworks

Collaborative for Academic, Social, and Emotional Learning (CASEL, 2020):

Self Awareness
Self Management
Social Awareness
Relationship Skills
Responsible Decision-Making

Autism Education Trust (AET, 2019):

Communication and Interaction
Social Understanding and Relationships
Sensory Processing
Interests, Routines, and Processing
Learning & Engagement
Emotional Understanding & Self-Awareness
Healthy Living
Independence & Community Participation

Social Emotional Learning in Action

SEL lectures & Skills
Role play
Innovation Hub challenges
Classroom

SEL journal
Reflections
Strategies & worksheets
Student self-monitors own learning

Apply to lives outside of SIPP

Feedback

Transforming the education of autistics:

COMPETENCY BASED ASSESSMENT

Project based learning

Transparency

Students participate in setting goals

Feedback loop

Benchmarks for goal achievement and badges

Variety of evaluation tools

TIMEFRAME & STRUCTURE

12 months
Begins July 2022

- Summer 1: 6-week Orientation
- Fall Semester: Pre-Calculus STEM I
- Spring Semester: English Comp STEM II
- Summer 2: 6-week Residency Final Project

- 13 college credits
- Fast-track admission to Vaughn College
- Dedicated job placement counselor
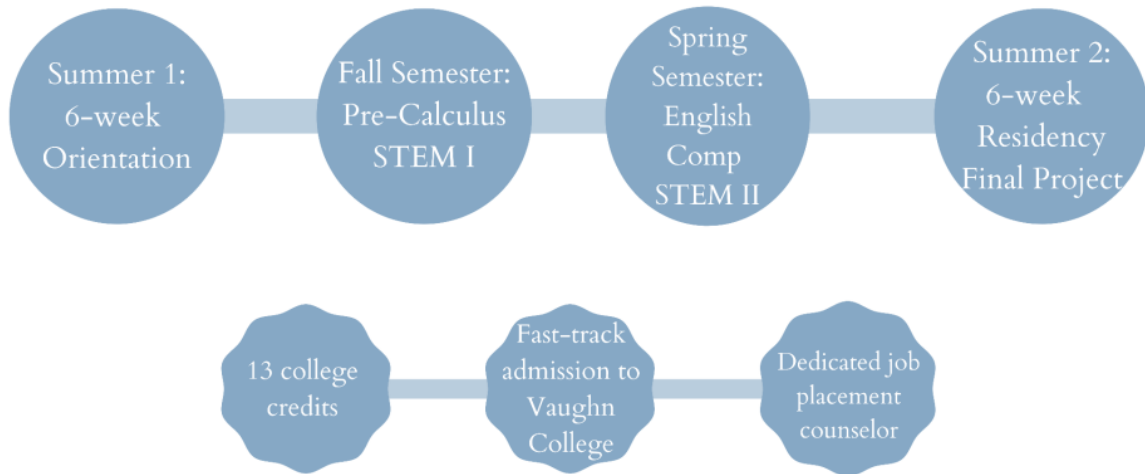
More Information

Principal Investigator: Eleanore Bednarsh
ebednarsh@spectruminnovates.org

SPECTRUM INNOVATES

NSF

VaughnCollege
of aeronautics and technology

www.spectruminnovates.org/sipp

ASN Media Link

SIPP Summer Orientation Curriculum

Overview:

The SIPP Summer Orientation official begins a student's journey through the Spectrum Innovates Pathway Program.

The Spectrum Innovates Pathway Program (SIPP) is a 12–month transition program for young adults on the autism spectrum as they navigate the path to college, employment and adult life and share an interest in aeronautics, aviation, engineering or technology.

Spectrum Innovates Pathway Program integrates academic, social-emotional, and life skills learning in an engaging, highly dynamic and supportive environment: the Innovation Hub. Course concepts and instruction are made relevant, absorbed and reinforced through this experiential, project-based approach. Skills such as goal-oriented thinking, problem solving,

self-advocacy, self-regulation, perspective taking, collaboration and communication emerge and are utilized as a natural consequence of engaging in work in the Innovation Hub.

Students successfully completing the program receive a certificate, 13 college credits and fast–track admission to Vaughn College and the myriad career programs they offer. Vaughn provides students, who complete Vaughn's programs, extensive career placement assistance. Alternatively, students may apply to other institutions or pursue entry positions in the workforce.

Development of SIPP is funded in part by an Advanced Technological Education grant from the National Science Foundation. For more information on the program visit https://www.spectruminnovates.org/Admissions.

This 6 week program is designed to develop a broad skill set designed to be a foundation for their year-long project based educational journey partnered with Vaughn. Skills include basic workshop safety and knowledge, a broad knowledge of materials used in aviation, machining, computer programing and mechatronics.

The Summer Program has three core modules: a computer programming and electronics module, a manufacturing and workforce module and the SEL (social-emotional learning) modules. The SEL module has two sessions per day, one in the morning and late in the afternoon, with SEL check-ins throughout the day. The computer and electronics module and maker shop skills module are 3 hour workshops, one in the morning and one in the afternoon.

The SIPP program has 20 students. The program is split into two cohorts of 10 students each.

A typical daily schedule:

	Cohort A	**Cohort B**
Morning: 8:30am to 9:00am	SEL	SEL
9:00am to 12:00pm	Computer Programming	Maker Shop Skills
12:00pm to 12:30pm	Lunch	Lunch
12:30pm to 3:30pm	Maker Shop Skills	Computer Programming
3:30pm to 4:00pm	SEL	SEL
4:00pm to 5:00pm	Social/Flex Time	Social/Flex Time

Manufacturing Technologies Module

Framework:
The Manufacturing Technologies module develops foundational skills through a maker's

perspective. Making, as defined by _____, is the exploration of materials, techniques and

mindset centered around passion-driven projects. The Summer Orientation in the Innovation

Hub explicitly matches passion projects with certain manufacturing skills and techniques to

make the connection for the learner between exploration and the workforce.

Students begin the summer session with a safety orientation and an exploration with

computer-aided design software. Early projects include cardboard prototypes with basic

linkages and mechanisms. Once students master the basics of CAD, additive and subtractive

manufacturing techniques and tools are explored, such as 3D printing, plasma and laser

cutting, metal machining and more.   Composites and casting techniques are explored in later

weeks. Finally, students utilize their skills to manufacture the chassis of a small robot or robotic arm.

Timeline:

Week 1:

Day 1: Safety & Cardboard Design

Day 2: CAD, Sketch/Extrude

Day 3: CAD, Assembly, Mates/Joints

Day 4: CAD Design Prompt

Day 5: Additive Manufacture, 3D Printing

Week 2:

Day 1: CAD, Technical Drawings

Day 2: CAD, Practice Parts

Day 3: 3D Scanning

Day 4: CAD Design Prompt #2, Optimizing Prints

Day 5: 3D Printing Tests

Week 3:

Day 1: Subtractive Manufacture (Laser/Plasma, GCode)

Day 2: Plasma Visit

Day 3: Sheet Metal Tools, Cardboard Challenge #2

Day 4: Sheet Metal in CAD, Raspberry Pi Case Design

Day 5: Laser/Plasma Production Day

Week 4:

Day 1: Maker Materials (Wood, Cardboard, Textiles, Metal, Fiberglass, Epoxy, Carbon Fiber)

Day 2: Casting With Molds

Day 3: Vacuum Forming Plastics w/ Desktop Thermoformer

 Day 4: Laser Cut Gears with Delrin; CAD Design Prompt #3

Day 5: Cast/Vacuum Forming/Laser Production Day

Week 5:

Day 1: Basic CNC Safety & Terms

Day 2: CNC Part Design & CAM Set Up

Day 3: CNC Mill Set Up, Mill Part #1

Day 4: CNC Part #2 Design & CAM Set Up

Day 5: CNC Mill Set Up, Mill Part #2

Week 6:

Day 1: CNC Part #3 Design & CAM Set Up

Day 2: CNC Mill Set Up, Mill Part #3

Day 3-6: Smart Car Chassis Design & Robot Arm Design

Sample Lessons

Basic Shop Safety Module

Suggested Timeline:
- Tour: 30min to 45min
- Tool Safety: 30 min per tool with a large group. 5 to 15 min per student.

Basic shop safety is the most important skill students learn in any maker environment. While every shop is different and presents its own unique challenges. For the SIPP program, the summer orientation offers a chance for the students to become familiar with the workshop and its possibilities. Safety must be a primary consideration.

Objectives:

- Students gain familiarity with shop and environs

- Students demonstrate knowledge of shop rules and procedures in context and written assessments

- Students demonstrate safe tool use

Tour of Shop (Day One)

- Types of hazards in a workshop/maker shop

  - Trips/Falls

  - Lacerations/Amputations

  - Catches and Nips

  - Fires

  - Chemical

  - Thrown debris

- Identifying Potential Hazards

  - Power cords

  - Fire Sources (Laser cutter, chemical/finishes, debris)

- Workspace Organizations & Courtesy

○ Return it how you found it or better

○ Safe space is a clean space

○ Pictures of work areas clean and ready for use.

Each tool should be demonstrated. Tools can be integrated into specific units and lessons as needed by the instructor. Some tools, such as hand tools and handheld power tools can be grouped together by instructor. Other tools, such as the table saw, CNC router or CNC mill will need extensive, intensive training for appropriate use.

Individual Tool Safety

Tool demonstrations will be held throughout the summer orientation and have similar components. Each tool demonstration should include:

- Short tool lecture (<20 min)

○ Identify type of hazards per tool

○ Describe purpose and potential use of the tool

○ Demonstrate safe use of the tool

○ Describe most common safety issues with tool (I.e. kickback, hair caught in drill press, chuck key left in chuck, etc)

- Student demonstration of competency

○ Checklist based rubric of competency

- Student basic skills exam

○ 10 to 15 questions, multiple choice, using straight ahead, everyday language.

- Student Resources Kit

○ Pre-Flight/Post-Flight Check Lists

○   Picture of Clean Workstation

○   Video Resource Explaining the Tool for Later Review

○   Website/QR code for Reading

Sample Weekly Plans for Safety Module

While presented as a weekly plan, this module can be modified to suit individual cohorts needs. Balancing hands-on project-based learning and direct instruction can be a difficult balance. Resources for sample tests can be found at the ITEEA website. Sample projects can be found throughout the internet. Autodesk's instructables.com has many, many great projects for maker educators to modify and share. Make sure to use appropriate appropriation when necessary.

Day One

Objectives:

●   Students gain familiarity with shop and environs

●   Students demonstrate awareness of shop rules and procedures

Activites

●   Shop & Facilities Tour

●   Review of First Aid/Emergency Procedures

●   Demonstration of basic hand tools

●   Web-based multiple choice exam

Project

1 Day Build: Cardboard Chair

- ○ Problem

- ○ Brainstorm

- ○ Design

- ○ Build

- ○ Tinker

- ○ Share

Day Two

Objectives

- Students gain familiarity with shop and environs

- Students demonstrate awareness of shop rules and procedures

Activities

- Teacher demonstration of basic power tools (drills, sanders, etc)

- Web-based multiple choice exam

Project

Challenge 2: Articulated Crane Arm

- ○ Problem

- ○ Brainstorm

- ○ Design

Day Three

Objectives:

- Students gain familiarity with shop and environs

- Students demonstrate awareness of shop rules and procedures

Activities:

- Demonstrations of Shop Bench Tools (Bandsaw, Sanders, Etc)

- Web-based multiple choice exam

Project

- Challenge 1 Day Two

  ○ Prototype

Day Four

Objectives:

- Students gain familiarity with shop and environs

- Students demonstrate awareness of shop rules and procedures

Activities

- Reflections on Lessons

- Big Picture Questions

- SEL Focused Questions

  ○ -emotion check-ins about different stages of learning

  ○ -moments when they showed grit, resilience, growth mindset

  ○ -how do they feel about their ability to use these tools/concepts

  ○ -how to ask for help with these tools and basic concepts

- Prime the Learner for Tomorrow's Reflection

Project:

- Challenge 1 Day Three

  ○ Prototype

○   Test

Day Five

Objectives

● 　 Students gain familiarity with shop and environs

● 　 Students demonstrate awareness of shop rules and procedures

Activities

● 　 Week Reflections

● 　 Maker Design Cycle

○ 　 Compare To: Writing, Scientific Method, Design Thinking, Engineering, etc.

● 　 SEL Final Connections

○ 　 -their first week experience vs. transition expectations

○ 　 -reflect on thoughts, feelings, and behaviors they had during week

Project

● 　 Share

Computer Programming Module

Framework

The Computer Programming Module teaches students to code in a project-based learning

environment. Students will be introduced to initial concepts and skills, and then develop their

own understanding and skills by working for extended periods of time investigating and

responding to authentic problems and challenges. In comparison to the more rigid structure

of the Manufacturing Technologies module, this module embraces the more creative,

project-centric approach of maker education. Here, students will imagine, envision, create,

innovate, play, formatively learn, experiment, collaborate, share, and most of all dream of the

possibilities inherent in the tools and technologies.

An *Overview of Workshop Approach*

The SIPP model relies heavily on the workshop approach to learning. In this module, students are introduced to the practice in context. First, students receive brief introduction lessons on the topic. Instructions and resources provided for the learner's own reference, while the learning takes place while exploring student's own projects, example code and various resources. A bulk of the learning happens from mistakes and iterating on design and code. For students, understanding why the mistake occurred deepens their understanding of coding.   Students develop grit and resilience through application of a variety of problem-solving strategies, such as determining whether the error was syntax or logic error. Other strategies may include try coding it in a different way, or read the error message, try a new version, iterate on designs and code

Timeline

Week 1

Introduction to microcontrollers and the CPX

Week 2

CPX exploration projects

Week 3

Intro to Arduino microcontroller and programming environment

Week 4

Arduino Weather Station: Data Logging and Display

Week 5

Arduino Autonomous Smart Cars

Week 6

Mini Passion Project

Sample Lessons

Week 1, Day 1: Getting Started -understanding computers and microcontrollers and how they work

   Objectives:

- Students will be able to describe the purpose and timing of this module.
- Students will be able to describe how computers and microcontrollers function

- Students will be able to program a microcontroller using a block programming

   language.

Overview of Content
- Learn about microcontrollers

   - CPX (Circuit Playground vs. the Arduino platform)

- Learn to code microcontrollers

   - Makecide/ javascript, arduino

- Learn circuitry

- Make!

Discussion
Ask students what do they know about how computers work? How does a computer work?

Watch:

[What makes a computer work?](#) 5 min from [Code.org](#)

Discussion Questions: What was one thing that stood out to you?

 What was one thing that you learned?

[The Journey Inside℠: Curriculum for Microprocessor](#)
Though this video is old, and "campy," the information is really clear and fun to watch. Ask

students to re-define:

- Electrical signals -

- Binary numbers

- Digital / analog

- inputs & outputs

Follow Up Discussion
    What did you find interesting?
    What is something that you learned?
    What is something that became clearer to you?

Other Video Resources

    [How Computers Work: Binary and Data](#)
    [How Computers Work: Circuits and Logic](#)
    [How Computers Work: CPU, Memory, Inputs, Outputs](#)
    [How Computers Word: Hardware and Software](#)

Week 1, Day 2 - 4: Intro to Circuit Playground Express (CPX), a microprocessor

Discussion:

What do you see on the CPX?

Overview of CPX
Watch :Limor Fried - inventor of CPX , explaining CPX
(Video Limor Fried discussing how she started the company)

Getting Started Programming:

Makecode Adafruit blocks / Javascript (text)

Overview of the Makecode blocks
Learn how to download the code

Explore and Program:

Outputs -
 LEDS -explore all the LED blocks: animation, pixel to pixel, set random (math block) colors
Watch: Images, Pixels, RGB
          Music - explore all the music blocks

Inputs -
Start with: Buttons, Light Sensor, Sound sensor, Slide Switch, Accelerometer, Temp Sensorn

Watch videos describing science behind the sensors

- Pins & Infrared Communication
- Reading Sensors

Strategies for documenting code with explanatory notes

Fill in the Chart:

Keep a record of your exploration with the code:
- Program music
- Program LEDs to make pictures, to write words
- Use button inputs
- Temp Sensor
- Light Sensor
- Accelerometer
- Sound Sensor
- Pins

Reflection
Students should reflect on both the skills and SEL skillsets used in their exploration. Great discussion questions include:

Did you have an aha moment?
What did you struggle with?

What did you figure out?

With students, brainstorm potential real life applications. When would an accelerometer or speaker be useful? Reverse engineer real life gadgets, such as Fitbits, weather stations, etc,.

Resources/Videos:
Light Sensor and the CPX
How does the Accelerometer work?
The science behind the speaker
The science behind the microphone
The science behind the Infrared signals

SEL Module

The Social Emotional Learning and Life Skills summer module consists of a basic

introduction of concepts and skills that will be practiced and revisited throughout the entire

year of SIPP. These concepts will be taught using videos, short presentations, and more. The

concepts will then be practiced as skills through free-standing SEL time blocks of role play,

short activities, and reflections. The concepts will be integrated and the skills practiced within

the Computer Programming module and Manufacturing module, as well.

SEL Standards

Spectrum Innovates Pathway Program's (SIPP) social emotional learning and life

skills standards are organized using CASEL's (2020) core competency framework for

children and adult's social emotional skills, the most widely used definition and framework of

social emotional learning. CASEL (2020) defines social emotional learning as "the process

through which all young people and adults acquire and apply the knowledge, skills and

attitudes to develop healthy identities, manage emotions and achieve personal and collective

goals, feel and show empathy for others, establish and maintain supportive relationships, and make responsible and caring decisions." We have chosen to use CASEL as the framework for SIPP's SEL and life skills standards since these are skills that all adults, including neurodiverse adults, need to excel in life. Given this, there are also standards that are specific to life skills for an autistic adult to ensure we prepare our learners for a smooth transition into successful adulthood.

SIPP's SEL standards also incorporate elements from Autism Education Trust's Progression Framework (2019), such as sensory processing, special/focused interests, social understanding and relationships, communication and interaction, emotional understanding and processing, and healthy and independent living. These elements address specific needs of autistic adult's life skills needed for success in adulthood. Care was taken to address the components of everyday life that lead to "autistic burnout," which autistic adults commonly report experiencing during their transition to adulthood (Raymaker, et. al., 2020).

Continuing efforts are made to avoid ableist language in SIPP's curriculum content, such as identity first language (autistic person) or "on the autism spectrum," which are more significantly preferred by autistic people (Bottema-Beutel, 2020). Additionally, the "double empathy problem," which is the breakdown of differences in experiencing and perceiving the world between autistic people and allistic (non-autistic) people is considered in the SIPP SEL standards and curriculum content (Milton, 2012).

SIPP's social emotional learning and life skills standards also consider the top soft skills that employers are interested in in 2021 (Leighton, 2021).

Lastly, SIPP's SEL standards are cross-referenced with the Autistic Self-Advocacy Network's "Roadmap to Transition: A Handbook for Autistic Youth Transitioning to Adulthood" to ensure our content aligns with typical experiences faced by autistic youth transitioning to adulthood and to provide them with the tools for self-advocacy throughout their lives.

The SIPP SEL standards may continue to evolve over the next few months and aim to guide the SIPP SEL curriculum units, lessons, and activities.

[SEL Benchmarks](#)

Self-awareness competency: develops a positive sense of self/identity by noticing one's emotions and/or energy, thoughts, behavior, and values and their relation to one's environment/context

Self-Awareness Standards:

1. Identify and understand their emotions, thoughts, behavior, and values, and their relationship.

2. Clarify one's identity and authentic self.

3. Identifies one's special/focused interest(s) and preferences for leisure activities.

4. Identify one's strengths and growth areas (weaknesses).

5. Develop self-efficacy, a growth mindset, self-confidence, and self-esteem.

6. Understand "neurodiversity," own diagnosis (autism), autistic strengths ("superpowers" and "kryptonite"), autistic "kryptonites," autistic burnout, and masking/unmasking and as they relate to oneself.

7. Recognizes change in relation to self (i.e. transitional changes into adulthood).

8. Identify and balance personal and professional life.

9.   Identifies energy levels, sensory needs and preferences, support needs, activities of daily living and instrumental activities of daily living, and health needs.

Self-management competency: use a range of executive functioning strategies to regulate one's energy and/or emotions, thoughts, and behaviors to engage in activities and environment

Self-Management Standards:

10.   Expresses and regulates emotions, thoughts, behaviors.

11.   Identifies and utilizes regulation strategies (e.g. stimming, self-care, stress management, etc.) to support health and prevent autistic burnout.

12.   Shows self-control.

13.   Shows adaptability.

14.   Shows self-motivation and takes initiative.

15.   Sets and works towards achieving personal and collective short-term and long-term goals while maintaining flexibility in goals.

16.   Uses executive functioning strategies to support overall functioning and learning.

17.   Evaluates and tracks the progress of own learning.

18.   Manages change in relation to self (e.g. transition to adulthood).

19.   Understands and follows routines, rules, and expectations of professionalism in school/work settings.

20.   Manages energy levels, support needs, sensory needs and preferences, activities of daily living and instrumental activities of daily living, and health needs.

21.   Self-advocates for needs in the environment (classroom, workspace, etc.).

Social awareness competency: understand others' perspectives from different cultures, contexts, and neurotypes using empathy and compassion

Social Awareness Standards:

22. Take others' perspectives (i.e. demonstrates cognitive empathy) and shows concern and compassion for others' emotions and needs (i.e. demonstrates affective empathy), including others with differing opinions.

23. Recognizes and supports others' strengths and growth areas.

24. Advocates for the rights of others to contribute to the common good of all.

25. Understands others' intentions.

26. Understands and expresses gratitude.

27. Identifies a range of social norms in various settings, stereotypes, and biases, including strategies for opposing unjust ones.

28. Recognizes demands of situations and opportunities of situations.

29. Understands when & how to be with others and when to take a break from others.

30. Understands systems thinking and how organizations/systems affect the behavior of others.

31. Uses algorithmic thinking

32. Identify situations that support time to unmask.

Relationship skills competency: identifies and uses communication skills (relevant to one's neurotype, style, & preferences), teamwork, and collaboration to develop and nurture supportive relationships and excel in groups in personal and professional life

Relationship Skills Standards:

33. Identifies and actively maintains a support network.

34. Communicates needs, wants, information, negotiates, resolves conflict, and asks for help when needed.

35. Understands giving and receiving feedback and constructive criticism.

36. Understands and uses nonverbal communication relevant to one's communication style and preferences for effective communication.

37. Develops positive relationships with supportive peers and adults.

38. Demonstrates cultural competence.

39.   Participates in group activities using teamwork and collaborative problem-solving.

40.   Shows leadership (Maker Leader Roles).

41.   Identifies and resists negative social pressure.

42.   Understands different types of and typical behaviors of relationships, understands consent, and maintains safety in relationships.

43.   Uses multiple communication methods such as oral presentations, written communication, and visual communication.

Responsible Decision-Making: makes decisions that align with one's personal and collective values based on information collected and analyzed across a range of situations

Responsible Decision-Making Standards:

44.   Demonstrates curiosity, open-mindedness, and creativity.

45.   Uses pattern recognition to problem solve.

46.   Makes a reasoned judgment after analyzing information, data, and facts.

47.   Makes a decision with trust in oneself.

48.   Identifies problems and solutions to problems.

49.   Makes intentional decisions: anticipates and evaluates the possible consequences of one's actions across settings and utilizes reflection to guide decision-making.

50.   Accepts and practices changes in decisions based on evidence collected.

51.   Uses problem-solving and critical thinking skills to solve academic, personal, professional, and collective problems.

52.   Continually evaluates one's role in personal, family, friendship, and community well-being.

53.   Makes decisions that align with values, needs, wants, and goals of self, group, and/or community, behaves with ethical responsibility, and understands and sets boundaries.

54. Understands when and how to increase, reduce, or maintain the load of responsibilities.

Week 1: Intro to SEL and Core Concepts

Objectives:

Learners share interests

Transition Expectations

SEL Standards & Benchmarks

Environment Expectations and schedule

Thoughts, feelings, & behaviors

Growth Mindset vs. Fixed Mindset (feedback & asking for help included)

Self-efficacy, self-worth, self-esteem

Week 2: Relationship skills and Self-management

Objectives:

Personal and professional life

Building and identifying a support network

Supporting adults/mentors and peers

Support Needs (Activities of Daily Living, Instrumental ADL, Spoons

Theory/Energy Meter)

Self-Care and Energy Management Strategies

Week 3: Self-awareness

Objectives:

Identifying one's strengths

Identifying one's growth areas

Basics of goal setting (short-term and long-term goals) - The ACT
Matrix,

values

Setting own short-term and long-term goals

Week 4-5: Self-management - Executive Functioning

Objectives:

Attention

Working memory

Verbal reasoning

Cognitive Flexibility (flexible thinking)

Planning

Organization

Self (inhibitory) control

Metacognition (awareness of your thoughts)

Task Initiation

Monitoring Tasks

Problem Solving

Week 6: Relationship Skills and Communication

Objectives:

Communication Skills 101

Listening - Empathy & Perspective-taking: Active listening

Speaking - Sharing thoughts, feelings, and opinions; adapting

communication style to audience

Group Activity skills

Spectrum Innovates
Spectrum Innovates Program
Spectrum Innovates Pathway Program
Spectrum Innovates Pathway Program at Vaughn College