

### College of Education and Human Development Division of Special Education and disAbility Research

#### Fall 2019

EDAT 610 DL1: Designing Adapted Environments CRN 78807, 3 – Credits

Instructor: Cindy George	<b>Meeting Dates</b> : 8/26/2019 – 12/18/2019
<b>Phone</b> : 571-230-7854	Meeting Day(s): Online
E-Mail: cgeorge4@gmu.edu	Meeting Time(s): Online
Office Hours: By appointment only	<b>Meeting Location</b> : N/A
Office Location: Krug Hall; room 105	<b>Other Phone</b> : 703-993-3670

➤ Note: This syllabus may change according to class needs. Teacher Candidates/Students will be advised of any changes immediately through George Mason e-mail and/or through Blackboard.

**Prerequisite(s)**: EDAT 510. Introduction to Assistive Technology. **Co-requisite(s)**: EDAT 510. Introduction to Assistive Technology.

### **Course Description**

Provides an overview of environmental adaptations for individuals with disabilities to increase their access to community, workplace, and school activities. Covers legal issues within the ADA for adapting environments and addresses programmatic and physical access issues. Notes: Field Experience required.

### **Advising Contact Information**

Please make sure that you are being advised on a regular basis as to your status and progress through your program. Mason M.Ed. and Certificate teacher candidates/students should contact the Special Education Advising Office at (703) 993-3670 for assistance. All other teacher candidates/students should refer to their faculty advisor.

### **Course Instructional Method**

EDAT 610 is a combination synchronous and asynchronous course. Using Blackboard, students are expected to complete assignments weekly and be engaged in course activities throughout the semester. In addition, students are expected to connect in real time for synchronous class meetings on the following dates using Blackboard Collaborate.

### **Course Delivery Method**

Learning activities include the following:

- 1. Class lecture and discussion
- 2. Application activities
- 3. Small group activities and assignments
- 4. Video and other media supports
- 5. Research and presentation activities
- 6. Electronic supplements and activities via Blackboard

This course will be delivered online (76% or more) using an asynchronous format via the Blackboard learning management system (LMS) housed in the MyMason portal. In addition, there are two synchronous classes from 4:30-7:10 PM on 9/16 & 12/9. You will log in to the Blackboard course site using your Mason email name (everything before "@masonlive.gmu.edu) and email password. The course site will be available on 8/25/19.

Under no circumstances, may candidates/students participate in online class sessions (either by phone or Internet) while operating motor vehicles. Further, as expected in a face-to-face class meeting, such online participation requires undivided attention to course content and communication.

Technical Requirements

To participate in this course, students will need to satisfy the following technical requirements:

 High-speed Internet access with standard up-to-date browsers. To get a list of Blackboard's supported browsers see:
 <a href="https://help.blackboard.com/Learn/Student/Getting\_Started/Browser\_Support#supported-browsers">https://help.blackboard.com/Learn/Student/Getting\_Started/Browser\_Support#supported-browsers</a>

To get a list of supported operation systems on different devices see: <a href="https://help.blackboard.com/Learn/Student/Getting\_Started/Browser\_Support#tested-devices-and-operating-systems">https://help.blackboard.com/Learn/Student/Getting\_Started/Browser\_Support#tested-devices-and-operating-systems</a>

- Students must maintain consistent and reliable access to their GMU email and Blackboard, as these are the official methods of communication for this course.
- Students will need a microphone for narrated presentations.
- Students may be asked to create logins and passwords on supplemental websites and/or to download trial software to their computer or tablet as part of course requirements.
- The following software plug-ins for PCs and Macs, respectively, are available for free download:
  - o Adobe Acrobat Reader: <a href="https://get.adobe.com/reader/">https://get.adobe.com/reader/</a>
  - Windows Media Player:
     <a href="https://support.microsoft.com/en-us/help/14209/get-windows-media-player">https://support.microsoft.com/en-us/help/14209/get-windows-media-player</a>
  - o Apple Quick Time Player: www.apple.com/quicktime/download/

### **Expectations**

- <u>Course Week</u>: Because asynchronous courses do not have a "fixed" meeting day, our week will start on Mondays, and finish on Sundays. Class begins 8/26/19. Both synchronous meetings are scheduled on Mondays; 9/16 & 12/9 (as indicated on Banner).
- <u>Log-in Frequency:</u> Students must actively check the course Blackboard site and their GMU email for communications from the instructor, class discussions, and/or access to course materials at least 2 times per week. In addition, students must log-in for all scheduled online synchronous meetings.
- <u>Participation:</u> Students are expected to actively engage in all course activities throughout the semester, which includes viewing all course materials, completing course activities and assignments, and participating in course discussions and group interactions.
- <u>Technical Competence</u>: Students are expected to demonstrate competence in the use of all course technology. Students who are struggling with technical components of the course are expected to seek assistance from the instructor and/or College or University technical services.
- <u>Technical Issues:</u> Students should anticipate some technical difficulties during the semester and should, therefore, budget their time accordingly. Late work will not be accepted based on individual technical issues.
- Workload: Please be aware that this course is **not** self-paced. Students are expected to meet *specific deadlines* and *due dates* listed in the **Class Schedule** section of this syllabus. It is the student's responsibility to keep track of the weekly course schedule of topics, readings, activities and assignments due.
- <u>Instructor Support:</u> Students may schedule a one-on-one meeting to discuss course requirements, content or other course-related issues. Those unable to come to a Mason campus can meet with the instructor via telephone or web conference. Students should email the instructor to schedule a one-on-one session, including their preferred meeting method and suggested dates/times.
- <u>Netiquette:</u> The course environment is a collaborative space. Experience shows that even an innocent remark typed in the online environment can be misconstrued. Students must always re-read their responses carefully before posting them, so as others do not consider them as personal offenses. *Be positive in your approach with others and diplomatic in selecting your words*. Remember that you are not competing with classmates, but sharing information and learning from others. All faculty are similarly expected to be respectful in all communications.
- <u>Accommodations:</u> Online learners who require effective accommodations to insure accessibility must be registered with George Mason University Disability Services.

### **Learner Outcomes**

Upon completion of this course, students will be able to:

- 1. Locate resources for adaptive environments.
- 2. Discuss the optimal layout design of an accessible workstation.
- 3. Apply the principals of universal design in assessing environments.
- 4. Conduct a functional needs assessment of an environment.
- 5. Design an adaptive environment within a community organization.

### **Professional Standards**

This course is part of the George Mason University, Graduate School of Education (GSE), Assistive Technology Program. The Assistive Technology Program has developed program specific standards in accordance with NCATE requirements. The Assistive Technology Program Standards incorporate several elements within the professional standards from the Council for Exceptional Children (CEC), while also expanding upon them to meet the specific needs related to assistive technology. The primary AT Program standards that will be addressed in this class include the following: Standard 3: Assessment and Planning, Standard 4: Practical Experience, and Standard 5: Professional Practice and Collaboration

\*NOTE: NCATE Assessments (in many but not all courses) may address additional AT Program standards.

### **Required Textbooks**

There is no required text.

### **Recommended Textbooks**

American Psychological Association. (2010). *Publication manual of the American Psychological Association* (6th ed.). Washington, DC: Author.

### **Required Resources**

Center for Universal Design (2011). *Principles of universal design*. Retrieved from North Carolina State University Web Site: <a href="http://design-dev.ncsu.edu/openjournal/index.php/redlab/article/viewFile/130/79">http://design-dev.ncsu.edu/openjournal/index.php/redlab/article/viewFile/130/79</a>

Institute for Human Centered Design (2011). ADA *checklist for readily available barrier removal*. (NIDRR grant number H133A060092-09A). Boston, MA: New England ADA Center. Retrieved from <a href="http://www.adachecklist.org/doc/fullchecklist/ada-checklist.pdf">http://www.adachecklist.org/doc/fullchecklist/ada-checklist.pdf</a>

U.S. Department of Defense (n.d.). *Workplace ergonomics reference guide* 2<sup>nd</sup> *edition: A publication of the computer/electronic accommodations program.* **Retrieved from** http://cap.mil/Documents/CAP Ergo Guide.pdf

Access Virginia: Virginia's Accessible Housing Resource http://www.accessva.org

- U.S. Department of Housing & Urban Development (2008). Fair housing: Equal opportunity for all. **Retrieved from**<a href="http://portal.hud.gov/hudportal/documents/huddoc?id=DOC\_11868.pdf">http://portal.hud.gov/hudportal/documents/huddoc?id=DOC\_11868.pdf</a>
- U.S. Department of Justice (2010). 2010 ADA standards for accessible design. **Retrieved** from http://www.ada.gov/2010ADAstandards\_index.htm

Wirkus-Pallaske, M., Reed, P., & Stokes, S. (2000). *Wisconsin Assistive Technology Initiative*. Oshkosh, WI: Wisconsin Assistive Technology Initiative.

### **Course Performance Evaluation**

Students are expected to submit all assignments on time in the manner outlined by the instructor (e.g., Blackboard, Tk20, hard copy).

### **Tk20 Performance-Based Assessment Submission Requirement**

It is critical for the special education program to collect data on how our students are meeting accreditation standards. Every teacher candidate/student registered for an EDSE course with a required Performance-based Assessment (PBA) is required to upload the PBA to Tk20 (regardless of whether a course is an elective, a one-time course or part of an undergraduate minor). A PBA is a specific assignment, presentation, or project that best demonstrates one or more CEC, InTASC or other standard connected to the course. A PBA is evaluated in two ways. The first is for a grade, based on the instructor's grading rubric. The second is for program accreditation purposes. Your instructor will provide directions as to how to upload the PBA to Tk20.

For EDAT 610, the required PBA is Environmental Adaptation Screening Project. Please check to verify your ability to upload items to Tk20 before the PBA due date.

### **Assignments and/or Examinations**

### Performance-based Assessment (Tk20 submission required)

The signature assignment(s) for this class is the: *Environmental Adaptation* Screening Project (with your direct portions highlighted). Please see specific assignment description below.

### College Wide Common Assessment (TK20 submission required)

There are no common assignments with other classes.

### Performance-based Common Assignments (No Tk20 submission required)

There are no common assignments with other classes.

### Field Experience Requirement

A Field Experience is a part of this course. A field experience is a variety of early and ongoing field-based opportunities in which candidates may observe, assist, tutor, and/or conduct research.

## Below are REQUIRED PROCEDURES FOR ALL STUDENTS ENROLLED IN THIS COURSE

1. Prior to representing George Mason in off-campus settings, visit this site:

http://cehd.gmu.edu/teacher/internships-field-experience.

The site has a comprehensive PowerPoint on the registration process and tips for a successful field experience. This is called the Field Experience Presentation.

2. Complete the online field experience registration form at the beginning of the semester (if not before) and complete the information requested. http://cehd.gmu.edu/endorse/ferf Fields marked with \* are required.

Please indicate how your placement will be arranged\*. Select the following:

• I have already been assigned a placement by my instructor or academic program for my field experiences.

Due by September 15, 2019.

### **Other Assignments**

### **Modifying Modules 1 & 2**

(10 points each; total 20 points)

Students must access the modifying the environment module and complete posted activities on Blackboard for Modules 1 & 2. Posted activities will include PowerPoint presentations of content, Internet search/research assignments, video exploration and viewing, and case study activities.

## Environmental Adaptation Preparation- Notes & Plan

(Notes/Plan each =10 points; total 20 points)

Students will access the *Environmental Adaptation Preparation* presentation and submit notes taken from its content <u>prior to</u> the Synchronized class session on 9/16/19. During the synchronized session, the class will discuss the Project, prepare a Project Plan, and assigned team participants. Team members must then further develop their section and submit the specific plan as a whole during the synchronous session.

# **Environmental Functional Needs Review** (25 points)

Students will select an environment and conduct a functional needs assessment. The assessment can be performed in a home, school, community, or workplace environment. Using principles of design, students will identify accessibility issues related specifically to three disability areas of their choice, plan a systematic approach for their resolution, and a provide a visual representation of the specific environment. An observation form will be posted on Blackboard that can be modified to fit the environment observed.

# **Environmental Adaptation Screening Project** (35 points)

### **Performance Based Assessment**

Students are required to participate as a team member to complete an assistive technology screening for a community organization that services individuals with disabilities. The screening will consist of the following:

### a. User Needs within Environment

Student helps the class as a whole develop the goals of the proposed AT screening using information presented by the targeted organization. The class then divides into teams; one team associated with one goal. The student assists their team in the development of specific outcome objectives associated with the assigned goal. The objectives are formulated following interviews with the organization's representatives, other organizational personnel and individuals who have disabilities and/or family members who potentially will benefit from the environmental screening.

### b. Identify Assistive Technology Suggestions and Recommendations

Team members are assigned to research specific objectives. The student considers the organization's interests, preferences, and needs to research and match technologies and strategies that may prove beneficial in supporting the screening objective. Attention to technology that spans within the hierarchy of no-tech to high-tech solutions that can also be used within different settings is made. Using Blackboard's Discussion Board, the student communicates weekly with other team members to plan, research and share technology selections and rationale. A mid-semester meeting with the instructor will review student's team progress and individual student's preparedness.

### c. Environmental Screening Report Writing

The environmental screening report will include the following sections:

- Community Organization Information
- Desired Goals & Objectives
- Interviews
- Observations
- Suggestions/Recommendations

The student collaborates with other team members to professionally write either the Interview or the Observation section of the final report for their team. The student individually produces their Suggestion/Recommendation section for the objective to which they are assigned. These recommendations include: a rationale for selection, description, a photo and vendor info (if applicable), and pros/cons in terms of acquisition and implementation.

- The written report will be submitted to instructor as a draft and reworked prior to its submission to the community organization. (*Draft due 11/24/19*; *Final due 12/15/19*)
- An oral presentation of the report will be expected of each section of the report by team members. This presentation should be supported by PowerPoint and be presented during the final synchronous class meeting (12/9/19 at 4:30 7:10 PM).

Tk20 & Final Survey due 12/16/19

## **Grading Rubric**

Assignment Requirements	Points	Comments
COMMUNICATION (9 points)		
Mid-Semester Meeting4 pts		
Class Communication via Blackboard 5 pts		
REPORT (20 points)		
Introduction of environment3 pts		
Interview of organization professionals and clients 3 pts		
Observational summary of the environment3 pts		
Identification of potential assistive technology solutions 4 pts		
Rationale of selection of assistive technology solutions 4 pts		
Literature to support report3 pts		
PRESENTATION (6 points)		
Summary of report content & findings2 pts		
Oral presentation of report 2 pts		
Visual presentation of report content & findings via PowerPoint2 pts		
Total Points (out of 35 possible)		

# Course Policies and Expectations Attendance/Participation

Students are expected to actively engage in <u>all</u> course activities throughout the semester, which include viewing of all course materials, completing course activities and assignments, and participating in course discussions and group interactions. Please note that while only certain learning elements are assessed through "grades", the instructor can still assess student involvement and engagement using other measures. Blackboard enables the instructor to view such data as login dates, duration of time spent online, access to specific content elements, and more. The instructor will use this data along with course grades to ensure that students are actively engaged in the course.

#### Late Work

Work will not be accepted if work is submitted a week past the due date. All work submitted late will automatically receive ½ credit unless arrangements are made in advance with the instructor.

### **Grading Scale**

Evaluation will be based upon a point system; point value for assignments are as follows:

Modifying the Environment Module 10		The following grading
Modifying the Home Environment Module 10		scale will be used at the
Preparation Notes & Plan20		Graduate level:
Environmental Functional Needs Review. 25		
Environmental Adaptation Screening Project 35		95-100% = A
TOTAL POINTS	100	90-94% = A-
		87-89% = B+
		83-86% = B
		80-82% = B-
		70-79% = C
		< 70% = F

\*Note: The George Mason University Honor Code will be strictly enforced. Students are responsible for reading and understanding the Code. "To promote a stronger sense of mutual responsibility, respect, trust, and fairness among all members of the George Mason University community and with the desire for greater academic and personal achievement, we, the student members of the university community, have set forth this honor code: Student members of the George Mason University community pledge not to cheat, plagiarize, steal, or lie in matters related to academic work." Work submitted <u>must</u> be your own or with proper citations (see <a href="https://catalog.gmu.edu/policies/honor-code-system/">https://catalog.gmu.edu/policies/honor-code-system/</a>).

### **Professional Dispositions**

Students are expected to exhibit professional behaviors and dispositions at all times. See <a href="https://cehd.gmu.edu/students/polices-procedures/">https://cehd.gmu.edu/students/polices-procedures/</a>.

### **Class Schedule**

\*Note: Faculty reserves the right to alter the schedule as necessary, with notification to students.

	Topic(s)	Readings & Assignments
Module 1 8/26 – 9/1	Introduction to Environmental Adaptation  • Ergonomics  • ADA  • Universal Design	Assignment:  Module 1: Modifying the Environment  Readings: Workplace Ergonomics Reference Guide http://cap.mil/Documents/CAP_Ergo_Guide.pdf  2010 ADA Standards for Assessable Design http://www.ada.gov/2010ADAstandards_index.htm  The Principles of Universal Design http://design- dev.ncsu.edu/openjournal/index.php/redlab/article/viewFile/130/79
Module 2 9/2 – 9/8	Home Modification  • Around the Home • Fair Housing	Field Experience Form with CEHD (Due 9/10/18)  Assignment: Module 2: Modifying the Home Environment Readings: Access Virginia: Virginia's Accessible Housing Resource http://www.accessva.org Fair Housing: Equal Opportunity for All http://portal.hud.gov/hudportal/documents/huddoc?id=DOC_11868 .pdf

Environmental Functional Needs Review		Assignments:  Functional Needs Review Assignment: (Due 9/16/18)
Mod – 6/6	Environmental Assessment Preparation	Assignments:  Environmental Adaptation Preparation: Notes (Due prior to Synchronous session at 4:30 on 9/16/19)
Module 4 9/16–9/22	Environmental Assessment Introduction & Group Planning	Synchronous Class Meeting: 9/16/19; 4:30 – 7:10 PM  • Weekly team communication  • Project goal and objectives  • General Assessment Timeline  Assignments: Environmental Adaptation: Group Plan
<b>Module 5</b> 9/23 – 10/13	Environmental Needs & Objectives Research	<ul> <li>Work Weeks:         <ul> <li>Team communication</li> <li>Assessment Interview (questions &amp; summary)</li> <li>Environmental Observation notes</li> </ul> </li> <li>Research to identify assistive technology suggestions and recommendations</li> <li>Assignment:         <ul> <li>DRAFT listing: Potential Thoughts on Assistive Technologies</li> </ul> </li> </ul>
Module 6 10/14 – 10/20	Mid-Semester Meeting	<u>Instructor Conference</u>

Module 7 10/21 – 11/10	Assistive Technology Research, Feature/User Matching & Recommendations	Work Weeks:  Team communication Interview/Observation write-up Finalize AT device/service suggestions and recommendations/ AT device category rationale Specific device descriptions & Pros/Cons
Module 8 11/11 – 11/24	Report Assembly	Assignment: Environmental Adaptation Screening: Environmental Screening Report Writing <u>DRAFT</u> (Due 11/24/19)
		Thanksgiving Holiday
Module 9 11/25 – 12/8	Presentation Development	Assignments: Summary of report developed as PowerPoint presentation
Module 10 12/9 – 12/16	Environmental Adaptation Assessment Report & Presentation	Assignments:  Online Synchronous Session  Monday, 12/9/19  4:30 – 7:00 PM  Oral PowerPoint Presentations (Due during final synchronous session)  Environmental Adaptation Screening:  Final Environmental Screening Report (Due 12/15/19)  Tk20 Submission and Final Survey (Due 12/16/19)

### **Core Values Commitment**

The College of Education and Human Development is committed to collaboration, ethical leadership, innovation, research-based practice, and social justice. Students are expected to adhere to these principles: <a href="http://cehd.gmu.edu/values/">http://cehd.gmu.edu/values/</a>

### **GMU Policies and Resources for Students**

#### **Policies**

- Students must adhere to the guidelines of the Mason Honor Code (see <a href="https://catalog.gmu.edu/policies/honor-code-system/">https://catalog.gmu.edu/policies/honor-code-system/</a>).
- Students must follow the university policy for Responsible Use of Computing (see http://universitypolicy.gmu.edu/policies/responsible-use-of-computing/).
- Students are responsible for the content of university communications sent to their Mason email account and are required to activate their account and check it regularly. All communication from the university, college, school, and program will be sent to students solely through their Mason email account.
- Students with disabilities who seek accommodations in a course must be registered with George Mason University Disability Services. Approved accommodations will begin at the time the written letter from Disability Services is received by the instructor (see <a href="http://ods.gmu.edu/">http://ods.gmu.edu/</a>).
- Students must silence all sound emitting devices during class unless otherwise authorized by the instructor.

### **Campus Resources**

- Support for submission of assignments to Tk20 should be directed to <u>tk20help@gmu.edu</u> or <u>https://cehd.gmu.edu/aero/tk20</u>. Questions or concerns regarding use of Blackboard should be directed to <u>http://coursessupport.gmu.edu/</u>.
- For information on student support resources on campus, see <a href="https://ctfe.gmu.edu/teaching/student-support-resources-on-campus">https://ctfe.gmu.edu/teaching/student-support-resources-on-campus</a>

For additional information on the College of Education and Human Development, please visit our website <a href="https://cehd.gmu.edu/students/">https://cehd.gmu.edu/students/</a>.

## Appendix

### **Assessment Rubric(s)**

Assessment Does Not				
	Criteria		Meets	Exceeds
	Criteria	Meet	Expectations	Expectations
<b>D</b> .	T 10 .	Expectations		_
Environment	Indicator	Candidate fails	Candidate	Candidate uses
Needs Analysis	3.4:	to use multiple	uses multiple	multiple types
	Candidates	types of	types of	of assessment
AT Program	understand	assessment	assessment	information
Standards 3.4	the use of	information to	information to	within the
	multiple types	provide	provide	client's natural
	of assessment	evidence of	evidence of	environment to
	information.	assistive	assistive	provide
		technology	technology	evidence of
		needs.	needs.	assistive
				technology
				needs.
Environment	Indicator	Candidate fails	Candidate	Candidate
Needs Analysis	4.3:	to apply	applies	applies
	Candidates	knowledge and	knowledge and	knowledge and
AT Program	develop and	skills to assess	skills to assess	skills to assess
Standards 4.3	customize	specific	specific	specific
	individualized	environment	environment	environment
	technology-	needs for	needs for	needs for
	based	planning the	planning the	planning the
	solutions to	screening of	screening of	screening of a
	address	assistive	assistive	range of
	exceptional	technology	technology	assistive
	needs.	tools and	tools and	technology
		strategies that	strategies that	tools and
		may be	may be	strategies
		potentially	potentially	within multiple
		meaningful	meaningful	environments
		and useful to	and useful to	that are
		individuals	individuals	meaningful and
		with	with	useful to
		exceptional	exceptional	individuals
		needs, their	needs, their	with
		families,	families,	exceptional
		and/or their	and/or their	needs as well as
		community of	community of	their families
		support.	support.	and community
		-apport	~~PP~~	of support.
				or support.

	Assessment Criteria	Does Not Meet Expectations	Meets Expectations	Exceeds Expectations
Environment Needs Analysis AT Program Standards 3.2	Indicator 3.2: Candidates identify and match appropriate technology based on individual and environmental needs while also considering personal interests, preferences, values and cultural influences.	Candidate fails to identify and match appropriate assistive technology based on an individual's interests, preferences, values, and cultural influences.	Candidates identifies and matches appropriate assistive technology based on an individual's interests, preferences, values, and cultural influences.	Candidates identifies and matches appropriate assistive technology based on an individual's interests, preferences, values, and cultural influences across environments, settings, and life span.
Environment Needs Analysis AT Program Standard 3.6	Indicator 3.6: Candidates use results of assessments in selecting assistive technology tools and strategies for individual with exceptional needs across environment and settings.	Candidate fails to use results of needs assessments to support goals and write objectives for screening an environment for appropriate technologies for individuals with exceptional needs.	Candidate uses results of assessments to support goals and write objectives for screening an environment for appropriate technology for individuals with exceptional needs.	Candidate uses results of assessments to support goals and write objectives appropriate technology for individuals with exceptional needs across environments, settings, and life span.

	Assessment Criteria	Does Not Meet Expectations	Meets Expectations	Exceeds Expectations
AT Recommendations AT Program Standard 2.4	Indicator 2.4: In conjunction, candidates possess a repertoire of evidences- based strategies to develop personalized supports for individuals with exceptional needs across environments, settings, and the life span.	Candidate fails to use results of assessments to identify and match assistive technology tools developed to support individuals with exceptional needs within a specific environment.	Candidate uses results of assessments to identify and match assistive technology tools appropriate for supporting individuals with exceptional needs within a specific environment.	Candidate uses results of assessments to identify and match assistive technology tools and implementation strategies appropriate for supporting individuals with exceptional needs across environments, settings, and the life span within a specific environment.