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Concept Construxions & The Universal Design for Learning

It is interesting yet not surprising that the same design principles that inspired **Teachers for Learners** products also laid the foundations for the Universal Design for Learning (UDL). In the 1980's, Ron Mace of North Carolina State University developed methods and guidelines for architecture and product design that consider applications to multiple users in multiple contexts (CAST, 2011, p.3). The work of CAST followed suit, with an eye toward curriculum design for the development of life-long learners. The following tables take each UDL principle and provide an explanation of how CCX offers a practical classroom tool to actualize select checkpoints. In summary, 22 of 31 checkpoints are explicitly aligned with appropriate and tested uses of Concept Construxions in the classroom.*

I. Provide Multiple Means of Representation (UDL)		Concept Construxions Applications
Provide Options for Perception	Checkpoint 1.1 – Offer ways of customizing the display of information	CCX is designed for flexibility and customized use. Used as a reading strategy, print text becomes more accessible when students use CCX to revise and add to others' conceptualizations or previous learning. Emphases change depending on how certain students interpret the lesson at hand, as well as where the lesson falls in the overall trajectory of the unit.
	Checkpoint 1.2 - Offer alternatives for auditory information	CCX is designed to enhance verbally delivered information by coupling talk with tangible artifacts and a pattern-recognition system. CCX also may be used with sound recordings to help emphasize key concepts and make connections visually. Conversely, visual displays and graphic organizers with Concept Cards are almost always coupled with descriptive talk and explanations for learners who require more conversational support for graphic interpretation.
	Checkpoint 1.3 - Offer alternatives for visual information	
Provide options for language, mathematical expressions, and symbols	Checkpoint 2.1 - Clarify vocabulary and symbols	The shape system highlights the differences between among, notations, abbreviations & words or phrases. Pre-teaching with CCX in order to emphasize these important connections is a standard use case for the system.
	Checkpoint 2.2 - Clarify syntax and structure	The physical and spatial movement of Concept Cards allows teachers and students to construct, deconstruct and reconstruct visual displays such as T-charts, flow charts, concept graphs, taxonomies and timelines. This movement helps students to visualize component parts and then reorganize them in ways that aid their further comprehension.
	Checkpoint 2.3 - Support decoding of text, mathematical notation, and symbols	CCX provides "flexibility and easy access to multiple representations of notation where appropriate (e.g., formulas, word problems, graphs)" (CAST, 2011, p. 17). And better than a list of key terms, the color-shape system provides a stable system as the use of the same symbol or notation changes. The system provides mathematical consistency and coherence through the secondary grades.
	Checkpoint 2.4 - Promote understanding across languages	The CCX color-shape system is designed to work in multiple languages across multiple disciplines and through multiple levels. The ability of the system to expand is what makes CCX such a robust solution for teaching and learning across a variety of environments.
	Checkpoint 2.5 - Illustrate through multiple media	CCX itself provides an alternative to print text, for the reasons explained above and earlier in this paper. Students also add their own illustrations, depictions, downloads, photos and drawings to the Construxion Site or Converse and Convey Panel in order to enhance visualization. Teachers also use video and animations projected on Smart Boards alongside a CCX display for enhanced understanding.

* Not all UDL checkpoints are included in these tables. Only those that align directly and explicitly are explained here.

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I. Provide Multiple Means of Representation (UDL) [Cont.]		Concept Construxions Applications
Provide options for comprehension	Checkpoint 3.1 - Activate or supply background knowledge	These UDL Checkpoints comprise the hallmark instructional premises of the CCX system. The implementation examples provided by CAST (2011) describe the types of instructional immersions that EduChange conducts in the professional development sessions for teachers. Below please find relevant excerpts from their UDL Guidelines Version 2.0 (pp. 19-21): • "Anchor instruction by linking to and activating relevant prior knowledge (e.g., using visual imagery, concept anchoring, or concept mastery routines) • Use advanced organizers (e.g., KWL methods, concept maps) • Highlight or emphasize key elements in text, graphics, diagrams, formulas • Use outlines, graphic organizers, unit organizer routines, concept organizer routines, and concept mastery routines to emphasize key ideas and relationships • Provide scaffolds that connect new information to prior knowledge (e.g., word webs, half-full concept maps) • Offer opportunities over time to revisit key ideas and linkages between ideas"
	Checkpoint 3.2 - Highlight patterns, critical features, big ideas, and relationships	
	Checkpoint 3.3 - Guide information processing, visualization, and manipulation	
	Checkpoint 3.4 - Maximize transfer and generalization	

II. Provide Multiple Means of Action and Expression (UDL)		Concept Construxions Applications
Provide Options for Expression and Communication	Checkpoint 5.1 – Use multiple media for communication	CCX provides physical manipulatives that help students engage in academic discourse. Having this tangible support provides security, and gives students more confidence when discussing text, art, visuals, video or other media.
	Checkpoint 5.2 – Use multiple tools for construction and composition	CCX acts as a pre-reading, post-reading, pre-writing, and modeling device for students who are engaged in project-based learning where their own compositions and products are front and center. The revisionist, iterative nature of the design process is freely supported, and encouraged, by the use of CCX.
	Checkpoint 5.3 – Build fluencies for graduated levels of support for practice and performance	Mathematical and literary fluency is supported by the use of the relevant Concept Cards in different contexts, with different texts, and with different problems experienced over multiple years. The vertical articulation allows teachers to continue scaffolding concepts that require it, while retiring concepts that students have internalized.
Provide options for executive functions	Checkpoint 6.2 – Guide planning and strategy development	CCX makes it easy for math teachers to guide problem-solving planning and allow students to share multiple strategies before actually solving the problem at hand. This practice emphasizes the process, and not the correct answer. In science, the design of experimental procedures also should be planned and revised, for safety purposes as well as to clarify purposes in the lab.
	Checkpoint 6.3 – Facilitate managing information and resources	CCX is the ultimate conceptual organization aid, providing a prominent, consistent and ready reference in the classroom. Students refer to the Concept Banks and also to completed displays in order to jog their memories and keep them grounded in the task at hand.
	Checkpoint 6.4 – Enhance capacity for monitoring progress	Teachers find CCX to be incredibly useful as a formative assessment tool, and students can gauge progress based on the kinds and numbers of connections they make. Concept Cards that are used with ease stand out in classroom activities and discussion, and there is a visible remnant of those concepts that were left behind during the activity. Both teachers and students can reflect on why that was the case.

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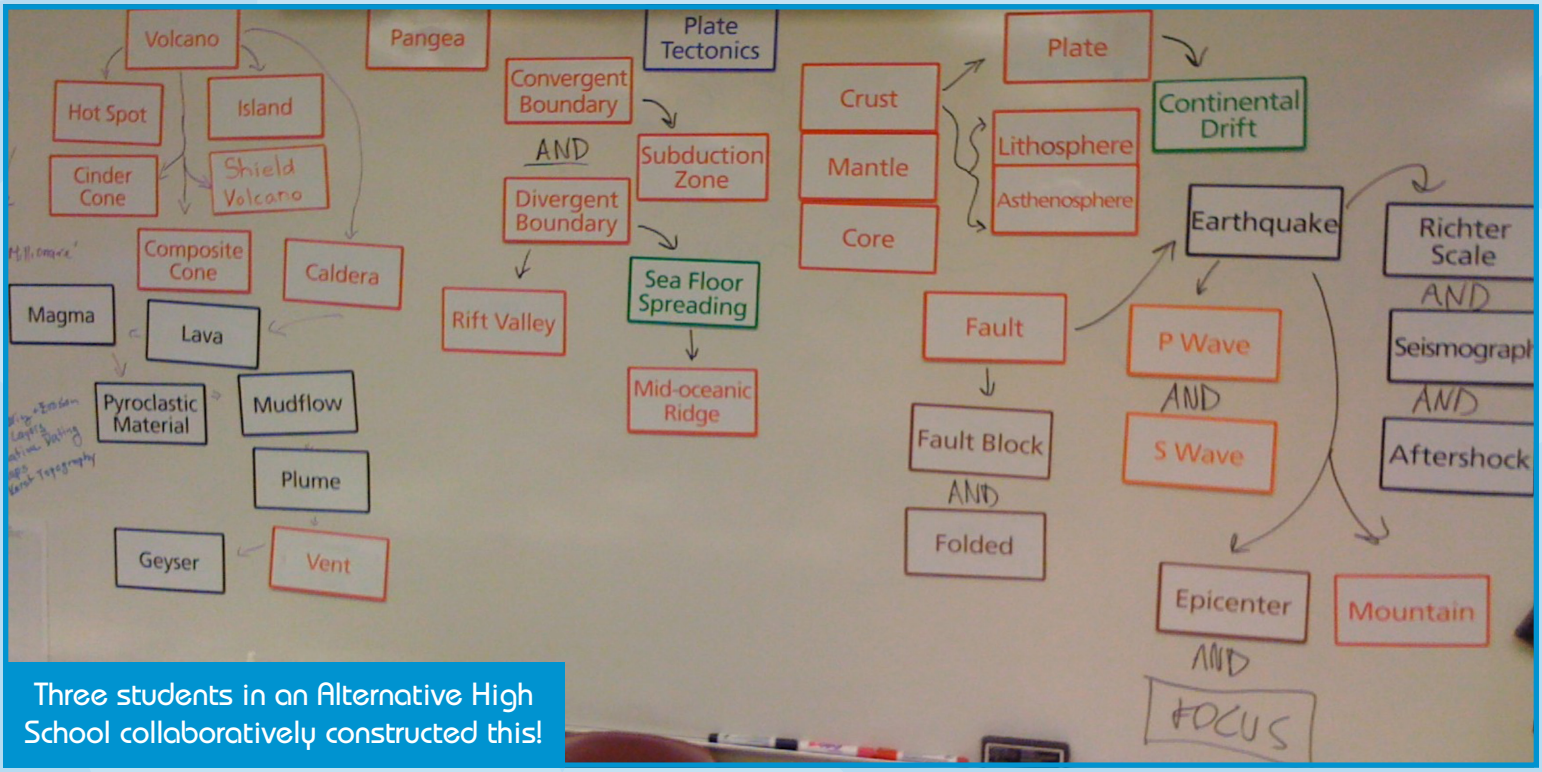
II. Provide Multiple Means of Engagement (UDL)		Concept Construxions Applications
Provide Options for Expression and Communication	Checkpoint 7.2 – Optimize relevance, value and authenticity	CCX invites learners to bring their own perspectives to the table. When teachers "provide tasks that allow for active participation, exploration and experimentation," CCX elicits engagement from all learners. Other relevant and tested CCX classroom experiences are highlighted in CAST's implementation examples: • "Invite personal response, evaluation and self-reflection to content and activities • Include activities that foster the use of imagination to solve novel and relevant problems, or make sense of complex ideas in creative ways" (2011, p. 29)
	Checkpoint 7.3 – Minimize threats and distractions	Teachers observe that students feel safe and unthreatened when using CCX, and they are more inclined to share confusions, take risks, or challenge another's point. Since it is designed to breed social constructivism, there is a natural kind of differentiation that invites each learner to participate in his/her own way. This may include non-verbal participation, as from a pre-production ELL.
Provide options for sustaining efforts and persistence	Checkpoint 8.3 – Foster collaboration and community	CCX supports the development of communities of practice in the classroom. Once again, it provides a predictable system when groups and roles change. This supports teachers in managing more complex configurations in the classroom, encouraging them to provide opportunities for peer collaboration that increase in sophistication over time.
	Checkpoint 8.4 – Increase mastery-oriented feedback	Physical, visual and verbal cues from students allow teachers to provide immediate, corrective feedback when needed. And, teachers can walk up and rearrange or model a different solution or strategy if necessary. Since the goal is exposure to multiple applications of the same concepts, students understand that they will have the opportunity to try again at another moment or on their own time. Students often find CCX useful during after-school sessions when they are in need of extra support for advancement or remediation.

Source: CAST (2011). Universal Design for Learning Guidelines version 2.0. Wakefield, MA: Author.



Three students in an Alternative High School collaboratively constructed this!