# Multiple means of representation

Learners perceive and comprehend information presented in the courses differently. Many factors have contributed to such variation, such as cultural differences and learning disabilities. In addition, learners may also have varied learning styles. For example, some learners understand the information faster when they have opportunities to engage in visual materials (e.g., images and video clips). As learners enrolling in the microcredential courses may come from diverse backgrounds and have different learning preferences, course designers should provide multiple options to present the course materials to satisfy learners’ needs. One question the course designers should consider is: are the course materials and contents presented in multiple ways?

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| Provide multiple means of representation |
| Provide options forperception | Example | Check |
| Offer ways of customizing the display of information | Pay attention to information display (e.g., font size, color, sound volume, visual layout)  |  |
| Offer alternatives for auditory information | Use the closed captioning function and provide a written transcript for Zoom |  |
| Offer alternatives for visual information | Create a screencast explaining an assignment in addition to a text description |  |
| Provide options forlanguage & symbols | Example | Check |
| Clarify vocabulary and symbols | Add support for vocabulary and symbols within the text (e.g., hyperlinks or footnotes to definitions, explanations, illustrations, previous coverage, and translations) |  |
| Clarify syntax and structure | Use a concept map to explain and connect the unfamiliar concepts |  |
| Support decoding of text, mathematical notation, and symbols | Allow the use of Text-to-Speech |  |
| Promote understanding across languages | Provide translation tools (e.g., DeepL) for learners to refer to on critical concepts |  |
| Illustrate through multiple media | Display information in multiple formats, such as lecture, text, graphics, audio, video, hands-on exercises |  |
| Provide options forcomprehension | Example | Check |
| Activate or supply background knowledge | Use examples, analogies, and metaphors to connect the concepts with learners’ existing knowledge |  |
| Highlight patterns, critical features, big ideas, and relationships | Provide multiple examples and practice opportunities (e.g., assignments) to draw learners’ attention to the critical skills to master at each stage |  |
| Guide information processing and visualization | Chunk the content into smaller components and release them progressively |  |
| Maximize transfer and generalization | Design multiple opportunities (e.g., practice sets, projects, feedback) for learners to practice and apply the targeted competency |  |
| Resources |
| **UDL guidelines*** [Provide options for perception](https://udlguidelines.cast.org/representation/perception)
* [Provide options for language & symbols](https://udlguidelines.cast.org/representation/language-symbols)
* [Provide options for comprehension](https://udlguidelines.cast.org/representation/comprehension)

**Web Accessibility** * [Quick reference to the web content accessibility guideline (WCAG) requirements and techniques](https://www.w3.org/WAI/WCAG21/quickref/?versions=2.0)
* [World wide web consortium web accessibility initiative](https://www.w3.org/WAI/)
* [EASI – Equal access to software and information](http://easi.cc/) (Learners with disability to gain equal access to the information technology)

**Accessibility support resources** **Uoft Resources:*** [Accessibility guidelines](https://teaching.utoronto.ca/resources/accessibility-guidelines/)
* [Accessible learning object design – compliance checklist](https://utoronto.sharepoint.com/%3Aw%3A/s/001T_ITSOLSProjects/EZQqjYLIs_pNn8kXrYbvr_gBU3OEGawE09OFrVNzbYReiw?e=xaJaqg)
* [Accessible Learning Object Design – step-by-step tech support](https://access.onlinelearning.utoronto.ca/)
* [Captioning videos](https://teaching.utoronto.ca/resources/captioning-videos/)

**External resources:*** [PowerPoint accessibility: Add an alternative text label](https://webaim.org/techniques/powerpoint/#alttext) (With examples)
* [Best practices and how-tos: Steps to inclusive content](https://www.chhs.colostate.edu/accessibility/best-practices-how-tos/)

**Web accessibility tools*** [WAVE web accessibility evaluation tools](https://wave.webaim.org/)
* [14 Brilliant Tools for Evaluating Your Design’s Colors](https://www.webfx.com/blog/web-design/14-brilliant-tools-for-evaluating-your-designs-colors/)
* [Image analyzer](https://juicystudio.com/services/image.php)
	+ This website examines the accessibility of all images of a website
* [NVDA (NonVisual Desktop Access)](https://www.nvaccess.org/)
	+ Free screen reader
* [Types of alternative formats](https://snow.idrc.ocadu.ca/4b-0-alternative-formats/what-are-alternative-formats/)

**Third-party services*** [WebAIM](https://webaim.org/)

**Other resources*** [20 tips for teaching an accessible online course](https://www.washington.edu/doit/20-tips-teaching-accessible-online-course)
* [A quick checklist and tips from Queensland VET Development Centre](https://utoronto.sharepoint.com/%3Ab%3A/s/001T_ITSOLSProjects/EXYqAMwenhdHqSMzR1O6RR0B8TakSRbDtxp6QW9NrJo2Xw?e=e2p55k)
* [Principle I: provide multiple means of representation](https://www.mcgill.ca/access-achieve/faculty-staff/resources/udl-videos)
* [UDL and assessment](http://udloncampus.cast.org/page/assessment_udl#l1970374): Provide multiple means of representation
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