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| --- | --- | --- | --- | --- |
| **PERCEPTION** | | | | |
| **SENSORS** | | | **INTUITIVES** | |
| ***Dealing with concrete content*** | | | ***Dealing with abstract content*** | |
| much time spent dealing with concrete, aplication oriented material, facts and data | | | much time spent dealing with abstract, theoretical material | |
| adding links that contains facts | | | make lists of key concepts from material | |
| access of examples (concrete content) first | | | intuitive leaps through content, fast clicks on course material | |
| access of practice content first (before the theory) | | | adding links without descriptions | |
| much time spent for example access | | | freequent looking for hints | |
| higher number of exercises, practical tests done | | | ***Deep, imaginative, sees possibilities, theoretical, inventive*** | |
| lots of experimentation | | | frequent use of mind maps | |
| ***Notices details*** | | | more frequent multitasking (number of tabs opened in browser (or number of browsers opened) and frequent transition from one browser to the other | |
| repeated exercises revision | | | rapid learning (shorter learning duration) | |
| much exam delivery time | | | higher number of tests retaken | |
| higher ratio of time spent on quizzes in relation to the expected time | | | frequent use of conceptual maps | |
| dealing with details, no complication | | | frequent transition from one subject to the other | |
| doing practical tasks more than once | | |  | |
| much time spent on viewing the exam sample files first time | | |  | |
| higher number of exam revisions in relation to the time of exam | | |  | |
| high frequency of using online help | | |  | |
| much total time spent on assignments | | |  | |
| ***Goes by senses, lives in the present*** | | |  | |
| choose of tests with multiple-choise questions | | |  | |
| dealing with augmented reality, virtual reality | | |  | |
| higher number of examples reviewed | | |  | |
| higher number of times of using an instructor | | |  | |
| higher number of changes to the same answer to exercise/test/quiz question | | |  | |
| **INPUT** | | | | |
| **VISUAL** | **VERBAL** | | | **AUDIO** |
| ***More time spent on contents with the visual type of material, type of material bookmarked or existing in favorites is visual; choosing tasks of visual type from playlists ([37], [39]); using visual tools or widgets (regarding widgets’ features ([38]):*** | ***More time spent on contents with the verbal type of material, type of material bookmarked or existing in favorites is verbal; choosing tasks of verbal type from playlists ([37], [39]); using verbal tools or widgets (regarding widgets’ features ([38]):*** | | | ***More time spent on contents with the auditory type of material, type of material bookmarked or existing in favorites is auditory; choosing tasks of auditory type from playlists ([37], [39]); using auditory tools or widgets (regarding widgets’ features ([38]):*** |
| video, films | text, html text | | | audio |
| image, pictures, tables | slides | | | hypermedia courseware |
| frequent use of 3d models |  | | |  |
| animation | formules | | | conferencing |
| slides | higher number of chat visits | | | frequent use of mnemonics, rhyming, and rhythm to memorize new ideas [34] |
| graphics (diagrams, timelines, charts) | higher number of posts to forum | | | frequent use of ambient recordings [34], [92] |
| formulas | more material printing | | | number of likes for auditory content correspondingly |
| games | number of books ordered (for example, in digital library) | | | high number of additional audio access and much audio listening time |
| augmented reality | number of likes for verbal content | | | frequent use of voice-based playlist instructions |
| using geometry | high number of additional reading access and much additional reading time | | | use of music/sound to anchor the emotions (for inspiration of certain feelings and emotional states, motivation) [34] |
| maps | high frequency of reading help | | | frequent use of sound samples |
| hypermedia courseware | frequent use of text editors and other text editing tools (for example, notepad, linked to course content) | | | more frequent virtual lectures |
| mind maps (diagrams used to visually organize information) | higher number of times and longer time duration of using an instructor | | | frequent use of animated pictures with voice |
| demonstration, using data visualization, statistical graphics, information design or architecture | more frequent read of e-books, articles | | | higher number and duration of real time conversations |
| paying attention to color, layout, and spatial organization - using marker to highlight content [34] | higher number and duration of real time conversations | | | higher number and duration of real time conversations |
| number of likes for visual content correspondingly | high number of positive feedback on verbal content | | | high number of positive feedback on auditory content |
| high number of additional video access and much additional time spent for video-material |  | | | high assessments in audio tests |
| frequent use of video explanation and instruction |  | | |  |
| high assessments in tests with schemas, images, video, ect. |  | | |  |
| high number of positive feedback on visual content |  | | |  |
| **UNDERSTANDING** | | | | |
| **SEQUENTIAL** | | **GLOBAL** | | |
| learning in subsequent linear steps, for example, hypertext navigation is linear, learning path is sequential, navigation through knowledge path is linear | | pattern of access to information is non-sequential: non-sequential access to learning path elements | | |
| step by step assignments | | frequent use of choices from playlist | | |
| frequent use of instructor-led training or learning path | | accidental access to learning objects that have no primary relations | | |
| frequent download of manuals, using help | | pattern of access to information: jumping through the course content (in fit and starts); | | |
| dealing with understandable material | | attempted order to answer questions in each exercise is random | | |
| high frequency of the folder/cource view | | frequent use of conceptual maps | | |
| pre-courses/foreground needed for new content learning | | frequent dealing with outlines, overviews of the content, accessing abstract content first | | |
| pattern of access to information is continuous  exam results are high on fine-grained skills and explicit knowledge | | breadth first navigation pattern (trying to understand the “big picture”) | | |
| frequent adding tags | | exam results are high when content is accessed in fits and starts | | |
| frequent read of the content | | frequent guessing, correctly answering by chance | | |
| deeper hypertext coverage | | higher number of successfull results for the type of tests using marking of answers | | |
| higher number of course overview visits | | frequent adding summarry links | | |
| frequent making topic lists, references | | frequent registering on a web site | | |
| higher frequency of the use of search | | frequent transition from one subject/content to the other | | |
| navigation from parts to the whole | | more frequent multitasking (number of tabs opened in browser (or number of browsers opened) and frequent transition from one browser to the other; | | |
| sequential progress | | lower number of solved tests requiring detailed answers | | |
| exam results in relation to the length of time assigned to the exam: higher when more time is assigned to the exam | | frequent navigation to related elements | | |
| more time spent on viewing the exam sample files first time | |  | | |
| attempted order to answer questions in each exercise is sequential | |  | | |
| depth first navigation pattern | |  | | |
| frequent quided tours | |  | | |
| higher number of solved tests requiring detailed answers | |  | | |
| frequent spaced repetition **(**incorporation of increasing intervals of time between subsequent review of previously learned material in order to exploit the psychological [spacing effect](https://en.wikipedia.org/wiki/Spacing_effect)) | |  | | |
| higher number of times and longer time duration of using an instructor | |  | | |
| **ORGANISATION** | | | | |
| **INDUCTIVE** | | **DEDUCTIVE** | | |
| frequent validation | | access of abstract content | | |
| access of concrete content, examples first | | direct application of theory | | |
| time spent on exercises requiring generalization | |  | | |
| higher frequentcy of cross validation | |  | | |
| **PROCESSING** | | | | |
| **ACTIVE** | | **REFLECTIVE** | | |
| frequent experimentation | | exploring connections between links (between ideas) | | |
| frequent use hands-on activities to learn | | more frequent studying, using virtual reality tools or in virtual reality | | |
| frequent use of physical objects (flash cards, models, diagrams) | | make a lot of links as private | | |
| higher number of practices | | more frequent read the course‘scontent | | |
| frequent participation in forums, wiki, chats, social networks, virtual discussions (for example, higher the number of messages sent, the chat view times) | | higher number of tests on concepts and theories | | |
| more frequent use of e-mail systems | | more tasks on causal relations (why, if… then) | | |
| frequent participation in collaborative/group tasks (for example, initiation of proposal for group task ) | |  | | |
| using groupware, collaborative facilities | | higher number of recommended content’s uses | | |
| more frequent cross validation | | frequent sending feedback | | |
| more frequent peer reviewor evaluation | | frequent use of analytical tools | | |
| more frequent video conferencing | | higher number of tabs opened in browser (or number of browsers opened) and frequent transition from one browser to the other; frequent transition from one subject to the other | | |
| Frequent use of 3d models | | more likes on text, e-books, analytical content(charts, diagrams, ect.) | | |
| frequent use of games | | more frequent read of e-books, articles | | |
| frequent adding members to the network | | more frequent use of bibliography | | |
| frequent sending links to friends | | focus on exploring connections between ideas and concepts, using mind maps, hierarchies, relationships | | |
| high number of assigments with options for answers | |  | | |
| frequent participation in discussions | |  | | |
| higher number and duration of real time conversations | |  | | |
| More frequent brainstorming (gathering a list of ideas spontaneously contributed by it’s members) | |  | | |
| high number of exercises in relation to the amount of exercises proposed | |  | | |
| more frequent self-assessment (for example, using questionaires, tests) | |  | | |
| frequent use of communication tools (skype, lync., ect.) | |  | | |
| higher number of tests taken | |  | | |
| rapid learning (shorter learning duration) | |  | | |