An assessment tool for scoring evidence for the demonstration of *selected* CC2020 dispositions

This enhanced tool supports instructors in evaluating a student's demonstration of selected CC2020 dispositions.

The tool applies the expectation for competence set out in ISO 24773: *to apply knowledge and skills [...] successful[ly] [...] on an ongoing basis.* This implies that each disposition must be demonstrated in multiple activities over the duration of the student's course.

The distinctive feature of this tool is that it allows the designation of each disposition as "essential" or "supplementary". This is intended to support instructors of courses that focus on particular dispositions (labelled "essential" for the purpose of assessment) to provide feedback to students on how well they have demonstrated those dispositions.

Dispositions are labelled as Essential ("E") or Supplementary ("S") in the parameter entry area, B17: B27. *NB - only "E"s are counted - any other character is effectively equivalent to "S".*

The tool is based on counting items of evidence that demonstrate particular dispositions. It follows that there needs to be some record of such items of evidence - whether an expolict portfolio, a lab notebook, a professional development logbook or whatever, which can be iin any reasonable format, either electronic or paper-based. The portfolio can cover a defined period ranging from an individual module to the entire program.

Each item of evidence (portfolio item) should be *validated* - that is, based on evidence, or corroborated, or confirmed by a supervisor or teacher, and should also be *identifiable*, by date, entry number, page number, a url or similar.

Each portfolio item may record evidence of the successful demonstration of (aspects of) zero or more dispositions. The *assessment* required is simply to read each portfolio item and decide which dispositions, if any, have been demonstrated. A reference to the portfolio item is then entered against each disposition; the format of the reference is irrelevant - as long as it can be de-referenced!

The tool then performs an overall evaluation by counting the number of portfolio item references entered against each disposition.

The outcome is "Pass" if the (configurable) thresholds have been met, otherwise "not pass yet" if the student still needs to develop some of the selected dispositions.

The thresholds are derived from the values set for the configuration parameters, which are defined on the next sheet.

Usage notes

The configuration, input and output areas are denoted by shading:

configuration

input: *references to portfolio items*
output: *thresholds, scores and outcomes*
Non-input cells are locked.
The dispositions to be evaluated using this tool should be classified, in column B (rows 17:27), as E*ssential* "E" or *Supplementary* "S".   Note that portfolio item references against any disposition - whichever its classification - will count towards the overall item score, SID.

References

The development and usage of the tool, and the concepts underpinning it, are described in the following sources:

David S. Bowers and Mihaela Sabin. 2022. Using a Professional Skills Framework to Support the Assessment of Dispositions in IT Education. In *The 23rd Annual Conference on Information Technology Education (SIGITE '22), September 21–24, 2022, Chicago, IL, USA*. ACM, New York, NY, USA, 10 pages. https://doi.org/10.1145/3537674.3554747

David S. Bowers, M. Sabin, R. K. Raj, and J. Impagliazzo. 2022. Advancing Computing Education: Assessing CC2020 Dispositions. In *Frontiers in Education 2022 - to appear* (Uppsala, Sweden). IEEE, New York, NY, 9 pages.

ISO. 2019. *ISO/IEC 24773-1:2019 Software and systems engineering — Certification of software and systems engineering professionals — Part 1: General requirements*. Standard. International Organization for Standardization, Geneva, Switzerland.

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Portfolio Dispositions

Configuration Parameters		Default values		
(Count of) number of dispositions in tool	*ND*	11		
(Count of) number of dispositions labelled "essential"	*E*	*ND*		
(Count of) number of dispositions labelled "supplementary"	*NS*	*0*		
Minimum number of portfolio items to demonstrate any of the dispositions	*IMin*	2		
Maximum number of portfolio items to demonstrate any of the dispositions	*IMax*	4		
Minimum proportion of essential dispositions required to be demonstrated	*EProp*	80%		
Minimum average portfolio item references across the essential dispositions	*IEAvg*	2		
Minimum proportion of portfolio items to demonstrate dispositions overall	*IProp*	65%		
Thresholds		*Formulae*		
Minimum number of portfolio item references that must be entered	*TID*	*(= ND x IMax x IProp)*	rounded down	
Minimum number of portfolio item references for essential dispositions that must be entered	*TIE*	*(= NE x IMax x IProp)*	rounded down	
Minimum number of essential dispositions required to be demonstrated	*TE*	*(= E x EProp)*	rounded down	
Assessment Scores				
item reference count for essential disposition e	*Ie*			
item reference count for supplementary disposition s	*Is*			
Number of portfolio items recorded and validated	*SID*			
Number of portfolio items recorded and validated against essential dispositions	*SIE*			
Number of essential dispositions that have been demonstrated	*SE*			

Student name/id					Date		

Configuration

Output Parameters

			default values				
Minimum proportion of essential dispositions to be demonstrated	80%	EProp	80%		TID	Minimum number of portfolio item references that must be entered	
Maximum number of portfolio items to demonstrate any of the dispositions	4	IMax	4		TE	Minimum number of essential dispositions required to be demonstrated	
Minimum number of portfolio items to demonstrate any of the dispositions	2	IMin	2		TIE	Minimum number of portfolio item references for essential dispositions that must be entered	
Minimum average portfolio item references across the essential dispositions	2	IEAvg	2		SID	Number of portfolio items recorded and validated	
Minimum proportion of portfolio items to demonstrate dispositions overall	65%	IProp	65%		SIE	Number of portfolio items recorded and validated against essential dispositions	
					SE	Number of essential dispositions that have been demonstrated	

	Ess. / Supp.	Item 1	Item 2	Item 3	Item 4	Item 5	Id	Ess. OK	*Ie*	*Is*
				refs. to portfolio/reflection						
Disposition	"E" / "S"		*dates, urls, page/para nos etc.*							
Adaptable	E						0	N	0	
Collaborative	E						0	N	0	
Inventive	E						0	N	0	
Meticulous	E						0	N	0	
Passionate	E						0	N	0	
Proactive	E						0	N	0	
Professional	E						0	N	0	
Purpose-driven	E						0	N	0	
Responsible	E						0	N	0	
Responsive	E						0	N	0	
Self-directed	E						0	N	0	

Essential dispositions *E*	11							
Supp. dispositions *NS*	0						0	
Total Dispositions *ND*	11							
Thresholds					**Scores**			
	TE	8			*SE*	0		
	TIE	16			*SIE*		0	
	TID	28			*SID*			0
Demonstration of essential dispositions						**Not yet**		
Essential dispositions score							**Not yet**	
Overall evaluation outcome							**Not pass yet**	