Supplementary material 1: Search documentation

Search documentation – Education Resources Information Centre (ERIC) – 31.1.2018

#	Query	Limiters/Expanders	Last Run Via	Results
S5	S1 AND S2	Limiters - Peer Reviewed; Date Published: 19700101-20171231 Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - ERIC	812
S4	S1 AND S2	Limiters - Date Published: 19700101-20171231 Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - ERIC	1,850
S3	S1 AND S2	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - ERIC	1,877
S2	TI ((((elementary OR “elementary secondary” OR primary OR secondary) N2 (education* OR school*)) OR ((high OR “junior high” OR middle) N2 (school*)) OR “high school equivalency program*" OR "intermediate grade*" OR “K12” OR “K-12” OR “Grade 1” OR “Grade 2” OR “Grade 3” OR “Grade 4” OR “Grade 5” OR “Grade 6” OR “Grade 7” OR “Grade 8” OR “Grade 9” OR “Grade 10” OR “Grade 11” OR “Grade 12”)) OR SU ((((elementary OR “elementary secondary” OR primary OR secondary) N2 (education* OR	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen -	616,696

	school*)) OR ((high OR “junior high” OR middle) N2 (school*)) OR “high school equivalency program*" OR "intermediate grade*" OR “K12” OR “K-12” OR “Grade 1” OR “Grade 2” OR “Grade 3” OR “Grade 4” OR “Grade 5” OR “Grade 6” OR “Grade 7” OR “Grade 8” OR “Grade 9” OR “Grade 10” OR “Grade 11” OR “Grade 12”)) OR KW ((((elementary OR “elementary secondary” OR primary OR secondary) N2 (education* OR school*)) OR ((high OR “junior high” OR middle) N2 (school*)) OR “high school equivalency program*" OR "intermediate grade*" OR “K12” OR “K-12” OR “Grade 1” OR “Grade 2” OR “Grade 3” OR “Grade 4” OR “Grade 5” OR “Grade 6” OR “Grade 7” OR “Grade 8” OR “Grade 9” OR “Grade 10” OR “Grade 11” OR “Grade 12”)) OR AB ((((elementary OR “elementary secondary” OR primary OR secondary) N2 (education* OR school*)) OR ((high OR “junior high” OR middle) N2 (school*)) OR “high school equivalency program*" OR "intermediate grade*" OR “K12” OR “K-12” OR “Grade 1” OR “Grade 2” OR “Grade 3” OR “Grade 4” OR “Grade 5” OR “Grade 6” OR “Grade 7” OR “Grade 8” OR “Grade 9” OR “Grade 10” OR “Grade 11” OR “Grade 12”))		Advanced Search Database - ERIC	
S1	TI (((((Deep* OR “in depth” OR “in-depth” OR transfer) N2 (learning)) OR “deep level processing” OR “adaptive expertise”) OR ((“21st century”) N2 (skills OR learning OR knowledge OR competencies)))) OR SU (((((Deep* OR “in depth” OR “in-depth” OR transfer) N2 (learning)) OR “deep level processing” OR “adaptive expertise”) OR ((“21st century”) N2 (skills OR learning OR knowledge OR competencies)))) OR KW (((((Deep* OR “in depth” OR “in-depth” OR transfer) N2 (learning)) OR “deep level processing” OR “adaptive expertise”) OR ((“21st century”) N2 (skills OR learning OR knowledge OR competencies)))) OR AB (((((Deep* OR “in depth” OR “in-depth” OR transfer) N2 (learning)) OR “deep level processing” OR “adaptive expertise”) OR ((“21st century”) N2 (skills OR learning OR knowledge OR competencies))))	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - ERIC	4,817

Search documentation – Education Source – 31.1.18

#	Query	Limiters/Expanders	Last Run Via	Results
S5	S1 AND S2	Limiters - Scholarly (Peer Reviewed) Journals; Published Date: 19710101-20181231 Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - Education Source	614
S4	S1 AND S2	Limiters - Published Date: 19700101-20181231 Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - Education Source	880
S3	S1 AND S2	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - Education Source	885
S2	TI ((((elementary OR “elementary secondary” OR primary OR secondary) N2 (education* OR school*)) OR ((high OR “junior high” OR middle) N2 (school*)) OR “high school equivalency program*" OR "intermediate grade*" OR “K12” OR “K-12” OR “Grade 1” OR “Grade 2” OR “Grade 3” OR “Grade 4” OR “Grade 5” OR “Grade 6” OR “Grade 7” OR “Grade 8” OR “Grade 9” OR “Grade 10” OR “Grade 11” OR “Grade 12”)) OR AB ((((elementary OR “elementary secondary” OR primary OR secondary) N2 (education* OR school*)) OR ((high OR “junior high” OR middle) N2 (school*))	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search	400,115

	OR “high school equivalency program*" OR "intermediate grade*" OR “K12” OR “K-12” OR “Grade 1” OR “Grade 2” OR “Grade 3” OR “Grade 4” OR “Grade 5” OR “Grade 6” OR “Grade 7” OR “Grade 8” OR “Grade 9” OR “Grade 10” OR “Grade 11” OR “Grade 12”)) OR SU ((((elementary OR “elementary secondary” OR primary OR secondary) N2 (education* OR school*)) OR ((high OR “junior high” OR middle) N2 (school*)) OR “high school equivalency program*" OR "intermediate grade*" OR “K12” OR “K-12” OR “Grade 1” OR “Grade 2” OR “Grade 3” OR “Grade 4” OR “Grade 5” OR “Grade 6” OR “Grade 7” OR “Grade 8” OR “Grade 9” OR “Grade 10” OR “Grade 11” OR “Grade 12”)) OR KW ((((elementary OR “elementary secondary” OR primary OR secondary) N2 (education* OR school*)) OR ((high OR “junior high” OR middle) N2 (school*)) OR “high school equivalency program*" OR "intermediate grade*" OR “K12” OR “K-12” OR “Grade 1” OR “Grade 2” OR “Grade 3” OR “Grade 4” OR “Grade 5” OR “Grade 6” OR “Grade 7” OR “Grade 8” OR “Grade 9” OR “Grade 10” OR “Grade 11” OR “Grade 12”))		Database - Education Source	
S1	TI (((((Deep* OR “in depth” OR “in-depth” OR transfer) N2 (learning)) OR “deep level processing” OR “adaptive expertise”) OR ((“21st century”) N2 (skills OR learning OR knowledge OR competencies)))) OR AB (((((Deep* OR “in depth” OR “in-depth” OR transfer) N2 (learning)) OR “deep level processing” OR “adaptive expertise”) OR ((“21st century”) N2 (skills OR learning OR knowledge OR competencies)))) OR SU (((((Deep* OR “in depth” OR “in-depth” OR transfer) N2 (learning)) OR “deep level processing” OR “adaptive expertise”) OR ((“21st century”) N2 (skills OR learning OR knowledge OR competencies)))) OR KW (((((Deep* OR “in depth” OR “in-depth” OR transfer) N2 (learning)) OR “deep level processing” OR “adaptive expertise”) OR ((“21st century”) N2 (skills OR learning OR knowledge OR competencies))))	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - Education Source	5,995

Search documentation – Scopus – 31.1.18

5	(TITLE-ABS-KEY ((((deep* OR "in depth" OR "in-depth" OR transfer) W/2 (learning)) OR "deep level processing" OR "adaptive expertise") OR (("21st century") W/2 (skills OR learning OR knowledge OR competencies)))) AND (TITLE-ABS-KEY (((elementary OR "elementary secondary" OR primary OR secondary) W/2 (education* OR school*)) OR ((high OR "junior high" OR middle) W/2 (school*)) OR "high school equivalency program*" OR "intermediate grade*" OR "K12" OR "K-12" OR "Grade 1" OR "Grade 2" OR "Grade 3" OR "Grade 4" OR "Grade 5" OR "Grade 6" OR "Grade 7" OR "Grade 8" OR "Grade 9" OR "Grade 10" OR "Grade 11" OR "Grade 12")) AND (LIMIT-TO (PUBYEAR , 2018) OR LIMIT-TO (PUBYEAR , 2017) OR LIMIT-TO (PUBYEAR , 2016) OR LIMIT-TO (PUBYEAR , 2015) OR LIMIT-TO (PUBYEAR , 2014) OR LIMIT-TO (PUBYEAR , 2013) OR LIMIT-TO (PUBYEAR , 2012) OR LIMIT-TO (PUBYEAR , 2011) OR LIMIT-TO (PUBYEAR , 2010) OR LIMIT-TO (PUBYEAR , 2009) OR LIMIT-TO (PUBYEAR , 2008) OR LIMIT-TO (PUBYEAR , 2007) OR LIMIT-TO (PUBYEAR , 2006) OR LIMIT-TO (PUBYEAR , 2005) OR LIMIT-TO (PUBYEAR , 2004) OR LIMIT-TO (PUBYEAR , 2003) OR LIMIT-TO (PUBYEAR , 2002) OR LIMIT-TO (PUBYEAR , 2001) OR LIMIT-TO (PUBYEAR , 2000) OR LIMIT-TO (PUBYEAR , 1999) OR LIMIT-TO (PUBYEAR , 1998) OR LIMIT-TO (PUBYEAR , 1997) OR LIMIT-TO (PUBYEAR , 1996) OR LIMIT-TO (PUBYEAR , 1995) OR LIMIT-TO (PUBYEAR , 1994) OR LIMIT-TO (PUBYEAR , 1988) OR LIMIT-TO (PUBYEAR , 1985) OR LIMIT-TO (PUBYEAR , 1983) OR LIMIT-TO (PUBYEAR , 1978) OR LIMIT-TO (PUBYEAR , 1976)) AND (LIMIT-TO (DOCTYPE , "ar") OR LIMIT-TO (DOCTYPE , "re") OR LIMIT-TO (DOCTYPE , "ip"))	415 document results	
4	(TITLE-ABS-KEY ((((deep* OR "in depth" OR "in-depth" OR transfer) W/2 (learning)) OR "deep level processing" OR "adaptive expertise") OR (("21st century") W/2 (skills OR learning OR knowledge OR competencies)))) AND (TITLE-ABS-KEY (((elementary OR "elementary secondary" OR primary OR secondary) W/2 (education* OR school*)) OR ((high OR "junior high" OR middle) W/2 (school*)) OR "high school equivalency program*" OR "intermediate grade*" OR "K12" OR "K-12" OR "Grade 1" OR "Grade 2" OR "Grade 3" OR "Grade 4" OR "Grade 5" OR "Grade 6" OR "Grade 7" OR "Grade 8" OR "Grade 9" OR "Grade 10" OR "Grade	656 document results	

	11" OR "Grade 12")) AND (LIMIT-TO (PUBYEAR , 2018) OR LIMIT-TO (PUBYEAR , 2017) OR LIMIT-TO (PUBYEAR , 2016) OR LIMIT-TO (PUBYEAR , 2015) OR LIMIT-TO (PUBYEAR , 2014) OR LIMIT-TO (PUBYEAR , 2013) OR LIMIT-TO (PUBYEAR , 2012) OR LIMIT-TO (PUBYEAR , 2011) OR LIMIT-TO (PUBYEAR , 2010) OR LIMIT-TO (PUBYEAR , 2009) OR LIMIT-TO (PUBYEAR , 2008) OR LIMIT-TO (PUBYEAR , 2007) OR LIMIT-TO (PUBYEAR , 2006) OR LIMIT-TO (PUBYEAR , 2005) OR LIMIT-TO (PUBYEAR , 2004) OR LIMIT-TO (PUBYEAR , 2003) OR LIMIT-TO (PUBYEAR , 2002) OR LIMIT-TO (PUBYEAR , 2001) OR LIMIT-TO (PUBYEAR , 2000) OR LIMIT-TO (PUBYEAR , 1999) OR LIMIT-TO (PUBYEAR , 1998) OR LIMIT-TO (PUBYEAR , 1997) OR LIMIT-TO (PUBYEAR , 1996) OR LIMIT-TO (PUBYEAR , 1995) OR LIMIT-TO (PUBYEAR , 1994) OR LIMIT-TO (PUBYEAR , 1988) OR LIMIT-TO (PUBYEAR , 1985) OR LIMIT-TO (PUBYEAR , 1983) OR LIMIT-TO (PUBYEAR , 1978) OR LIMIT-TO (PUBYEAR , 1976))		
3	(TITLE-ABS-KEY ((((deep* OR "in depth" OR "in-depth" OR transfer) W/2 (learning)) OR "deep level processing" OR "adaptive expertise") OR (("21st century") W/2 (skills OR learning OR knowledge OR competencies)))) AND (TITLE-ABS-KEY (((elementary OR "elementary secondary" OR primary OR secondary) W/2 (education* OR school*)) OR ((high OR "junior high" OR middle) W/2 (school*)) OR "high school equivalency program*" OR "intermediate grade*" OR "K12" OR "K-12" OR "Grade 1" OR "Grade 2" OR "Grade 3" OR "Grade 4" OR "Grade 5" OR "Grade 6" OR "Grade 7" OR "Grade 8" OR "Grade 9" OR "Grade 10" OR "Grade 11" OR "Grade 12"))	663 document results	
2	TITLE-ABS-KEY (((elementary OR "elementary secondary" OR primary OR secondary) W/2 (education* OR school*)) OR ((high OR "junior high" OR middle) W/2 (school*)) OR "high school equivalency program*" OR "intermediate grade*" OR "K12" OR "K-12" OR "Grade 1" OR "Grade 2" OR "Grade 3" OR "Grade 4" OR "Grade 5" OR "Grade 6" OR "Grade 7" OR "Grade 8" OR "Grade 9" OR "Grade 10" OR "Grade 11" OR "Grade 12")	316,312 document results	
1	TITLE-ABS-KEY ((((deep* OR "in depth" OR "in-depth" OR transfer) W/2 (learning)) OR "deep level processing" OR "adaptive expertise") OR (("21st century") W/2 (skills OR learning OR knowledge OR competencies)))	22,865 document results	

Supplementary material 2: Overview included studies

						Key elements in definition			
No	**Author**	**Key term**	**School Subject**	**Sample age range**	**Country**	**Meaning**	**Relating**	**Intrinsic motivation**	**Other**
1	Aharony (2006)	Deep Learning Approach	Languages	12-18	Israel	x	x		Metacognitive strategies
2	Alkharusi (2013)	Deep Learning Strategies	Languages	15-17	Oman		x		Critical thinking
3	Baas et al. (2015)	Deep-level learning strategies	Not reported	9-12	The Netherlands	x			Application of knowledge
4	Beausaert et al. (2013)	Deep-approach to learning	Languages and Math	12-18	The Netherlands	x	x	x	
5	Blom and Severiens (2008)	Deep Learning	Languages and Math	15-16	The Netherlands	x			Critical thinking
6	Burnett and Proctor (2002)	Deep approach to learning	Languages and Math	10-12	Australia	x	x		Transformation
7	Burnett et al. (2003)	Deep learning	Not reported	12-20	Australia	x			
8	Campbell et al. (2001)	Deep approach to learning	Not reported	11-16	Australia	x	x		
9	Cano (2007)	Deep approach to learning	Not reported	16-17	Spain	x	x	x	
10	Cano and Cardelle-Elawar (2004)	Deep learning conception	Not reported	11-16	Spain	x			
11	Chan (2008)	Deep learning approaches	Science	12-17	Hong Kong	x			
12	Chan and Chan (2011)	Deep approach to learning	Not reported	12-17	Hong Kong	x	x	x	
13	Cheung (2014)	Deep learning strategies	Science	16-18	Hong Kong	x			Metacognitive strategies, Critical thinking
14	Cheung and Lai (2013)	Deep learning strategies	Not reported	16-17	Hong Kong	x			Metacognitive strategies, Critical thinking
15	Chin and Brown (2000)	Deep approach	Science	13-14	USA	x	x	x	
16	Chiou and Liang (2012)	Deep approach to learning	Science	16-17	Taiwan	x	x	x	
17	Chiou et al. (2013)	Deep approach to learning	Science	15-18	Taiwan	x	x	x	
18	Chou (2017)	Deep processing strategies	Languages	17-18	Taiwan	x			Metacognitive strategies
19	Chu et al. (2010)	Deep approach to learning	Computer Science	8-12	Hong Kong	x	x	x	
20	Çolak and Cirik (2016)	Deep learning	Not reported	14-15	Turkey	x			Long-term retention
21	Dahlin and Watkins (2000)	Deep approach to learning	Not reported	15-18	Hong Kong	x			
22	Dan and Todd (2014)	Deep-learning strategies	Social Science	12-13	China	x	x	x	
23	Dart et al. (2000)	Deep learning approach	Math, Science, Social Science, Languages, Art	11-16	Australia	x			Transformation
24	Dart et al. (1999)	Deep approach to learning	Math, Science, Languages, Art	11-16	Australia	x			Transformation
25	Elstad et al. (2012)	Deep learning approach	Science	16-18	Norway	x	x		
26	García et al. (2015)	Deep learning approach	Math	10-13	Spain		x		
27	Goto et al. (2018)	Deep learning approach	Science	8-15	Japan	x			
28	Göçmençelebi et al. (2012)	Deep learning	Science	10-13	Turkey	x	x		Long-term retention, Application of knowledge
29	Hii and Fong (2010)	Deep approach to learning	Social Science	13-14	Malaysia	x	x	x	
30	Ho and Liang (2015)	Deep motive in learning	Science	15-18	Taiwan	x		x	
31	Janeiro et al. (2017)	Deep approach to learning	Not reported	15-21	Portugal	x		x	
32	Kirby and Woodhouse (1994)	Deep approach to learning	Not reported	Not reported	Canada/Not reported	x		x	
33	Kong and Hau (1996)	Deep approach to learning	Not reported	13-14	Hong Kong	x		x	
34	Koopman et al. (2014)	Deep cognitive learning strategies	Not reported	12-18	The Netherlands		x		Critical thinking
35	Lai and Biggs (1994)	Deep approach to learning	Science	12-14	Hong Kong	x			
36	Lau et al. (2008)	Deep learning strategies	Math	14-15	Singapore	x	x		
37	Lee et al. (2008)	Deep approaches to learning	Science	15-18	Taiwan	x	x	x	
38	Li et al. (2018)	Deep approach to learning	Science	13-16	China	x			
39	Liem et al. (2012)	Deep learning	Not reported	13-14	Australia	x			
40	Lingvay et al. (2015)	Deep approach to learning	Science	11-18	Hungary and Romania	x			
41	Luby (2014)	Deep approach to learning	Religion	13-16	Scotland		x		
42	Matos et al. (2017)	Deep-level learning strategies	Math	14-15	Peru		x		Metacognitive strategies, Critical thinking
43	Mazlum et al. (2015)	Deep learning approaches	Languages	16-17	Iran	x	x		
44	McClintic-Gilbert et al. (2013)	Deep learning strategies	Math, Science, Languages, Social science	11-14	USA		x		Metacognitive strategies, Critical thinking
45	McInerney et al. (2012)	Deep learning strategies	Languages, Math	12-14	Hong Kong	x	x	x	
46	Munowenyu (2007)	Deep level learning	Science	13-14	Zimbabwe	x			
47	Murayama et al. (2013)	Deep learning strategies	Math	10-16	Germany		x		
48	Norris et al. (2015)	Deep approach to learning	Social science	13-14	England		x	x	
49	Phan and Ngu (2015)	Deep approach to learning	Languages	15-16	Fiji	x	x	x	
50	Rao et al. (2007)	Deep approach to learning	Languages	11-12	Singapore	x	x		
51	Rozendaal et al. (2001)	Deep-level processing	Vocational	12-18	The Netherlands		x	x	Metacognitive strategies, Critical thinking

52	Şen (2016)	Deep cognitive learning strategies	Not reported	16-17	Turkey		x		Critical thinking, Long-term retention, Application of knowledge
53	Smith and Colby (2007)	Deep approach to learning	Not reported	Not reported	USA	x			
54	van Aalst et al. (2007)	Deep learning	Computer Science	16-19	Hong Kong	x	x	x	
55	Vos et al. (2011)	Deep learning	Languages	10-12	The Netherlands	x	x		Critical thinking, Long-term retention, Application of knowledge
56	Watkins and Ismail (1994)	Deep approach	Not reported	14-15	Malaysia/Hong Kong/Australia	x	x	x	
57	Watkins et al. (2003)	Deep learning approach	Not reported	14-15	South Africa	x	x	x	
58	Wishart and Triggs (2010)	Deep learning	Science, Computer Science	11-23	Germany, Lithuania, Portugal, Austria, UK	x	x		
59	Yerdelen-Damar and Elby (2016)	Deep level processing	Science	15-17	Turkey	x			
60	Yerdelen-Damar and Aydin (2015)	Deep level processing	Science	14-20	Turkey	x			Application of knowledge
61	Zhang and Ziegler (2016)	Deep-learning approach	Languages and Math	12-16	China	x			
62	Zheng et al. (2017)	Deep learning approach	Science	10-12	China	x	x	x	
63	Önen (2015)	Deep approach to learning	Not reported	14-17	Turkey	x	x	x	Application of knowledge

No	Author	Key term	Subject	Sample age range	Origin	Key elements in definition
64	Grover et al. (2015)	Deeper learning	Computer Science	11-14	USA	Transfer, Cognitive skills, Interpersonal skills, Intrapersonal skills
65	Nehring and Szczesiul (2015)	Deeper learning	Not reported	12-18	Northern Ireland	Transfer, Cognitive skills, Interpersonal skills, Intrapersonal skills
66	Parker et al. (2013)	Deeper learning	Social science	13-18	USA	Adaptive transfer, differentiated, elaborated, integrated and flexible
67	Parker et al. (2017)	Deeper learning/Deep learning	Social science	13-18	USA	Adaptive transfer, differentiated, elaborated, integrated and flexible
68	Parker et al. (2011)	Deeper learning/Deep learning	Social science	13-18	USA	Adaptive transfer, differentiated, elaborated, integrated and flexible

	Author	Key term	Subject	Sample age range	Origin	Connection to deep learning
69	Grotzer et al. (2015)	Transfer of learning	Science	10-12	USA	Deep initial learning is a requisite for transfer of learning
70	Pugh et al. (2014)	Transfer of learning	Science	14-16	USA	Deep learning, is a requisite for transfer of learning
71	Schiff and Vakil (2014)	Transfer of learning	Math	8-12	Israel	Deep initial learning is a requisite for transfer of learning

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