

S/N	Authors	Type of intervention	Place	Subject of Interest	Instructional Strategy	Duration (in Hrs)	Nature of Learning Task	Nature of CT assessment	Explicit / Implicit	Type of Definition	Where Defined	Refere ntial ?	No of Partici pants	Gender	Grade Level
1	(Aksit & Wiebe, 2020)	Exploratory	school	Science	lecturing, simulation	4.17	Programming	non-programming	Implicit	conceptual	INT	Non	82	Mixed	Grade 7
2	(Angeli & Valanides, 2019)	Experimental	school	NA	problemSolving, scaffolding	1.33	non-programming	non-programming	Explicit	componential	THE	Non	50	Mixed	Kindergarten
3	(Ardito et al., 2020)	Exploratory	School	NA	collaboration	7.33	Programming	Programming	Implicit	conceptual	INT	Non	47	Mixed	Grade 6
4	(Cachero et al., 2020)	quasi-experiment	school	Programmi ng course	lecturing, Activitiespractic al	60	programming	non-programming	Explicit	componential	ASS	REF	104	Mixed	undergraduate
5	(Calderon et al., 2020)	quasi-experiment	school	Computer Science	Activitieslearnin g, collaboration	4	Non-programming	Non-programming	Explicit	componential	THE	Non	40	Mixed	college
6	(Cervera et al., 2020)	Exploratory	school	NA	mentoring, lecturing	1.5	Programming	Non-programming	Explicit	componential	ASS	REF	24	Mixed	Grade 2
7	(Chen & Chi, 2020)	Exploratory	school	NA	gameplaying	1	non-programming	Non-programming	Explicit	componential	ASS	REF	100	Mixed	Grade 5 and 6
8	(Chen et al., 2020)	Experimental	school	Design Course	modelling, simulation, prototyping	NA	non-programming	non-programming	Explicit	componential	ASS	Non	86	Mixed	college
9	(Chou, 2019)	Exploratory	school	NA	lecturing, scaffolding	16	Programming	Non-programming	Explicit	componential	THE	REF	12	Mixed	Grade 3
10	(Çınar & Tüzün, 2020)	Experimental	school	Programmi ng course	lecturing, Activitieslearnin g	NA	programming	Non-programming	Implicit	componential	ASS	Non	81	Mixed	Grade 10
11	(del Olmo-Muñoz et al., 2020)	quasi-experiment	school	NA	lecturing, collaboration, reflection, jigsaw	6	non-programming	non-programming	Explicit	componential	ASS	REF	84	Mixed	Grade 2
12	(Delal & Oner, 2020)	Exploratory	school	NA	lecturing, groupWork, Activitiesdesign	3.33	Non-programming	Non-programming	Explicit	componential	ASS	REF	53	Mixed	Grade 6
13	(Deng et al., 2020)	Experimental	school	NA	lecturing, constructivism	10.66	Programming	Non-programming	Explicit	componential	THE	REF	99	Mixed	Grade 10
14	(Hutchins et al., 2019)	Experimental	school	Physics	modelling, lecturing	NA	programming	non-programming	Implicit	componential	ASS	Non	174	NA	high school
15	(Kong et al., 2020)	Exploratory	camp	NA	lecturing, collaboration, peerReview	78	Programming	Non-programming	Explicit	componential	INT	REF	76	Mixed	In-service Teacher

16	(Leonard et al., 2020)	Exploratory	camp, school	Dance	lecturing	11	programming	Non-programming	Explicit	componential	THE	REF	170	Mixed	Grade 5 - 9
17	(Luo et al., 2020)	Exploratory	camp	science	lecturing, constructionism	8	programming	programming	Explicit	componential	THE	REF	2	Female	Grade 3, 5
18	(Mouza et al., 2020)	Exploratory	after-school	Computing	reflection, collaboration, roleModelling	10.5	programming	Non-programming	Explicit	componential	THE	REF	138	Mixed	Grade 4 - 6
19	(Newton et al., 2020)	Exploratory	after-school, camp	NA		40	programming	Programming	Explicit	componential	THE	REF	93	Mixed	Grade 3 - 6
20	(Noh & Lee, 2019)	Exploratory	school	Robotics	collaboration, lecturing	NA	programming	Non-programming	Explicit	componential	INT	Non	155	Mixed	Grade 5,6
21	(Papavlasopoulou et al., 2020)	Exploratory	camp	NA	constructionism	8	programming	non-programming	Explicit	componential	THE	REF	105	Mixed	NA
22	(Pérez-Marín et al., 2020)	quasi-experiment	camp, school	NA	metaphor	6	programming	non-programming	Explicit	componential	INT	REF	132	Mixed	Grade 4 - 6
23	(Rodríguez del Rey et al., 2020)	Experimental	school	Computer Engineering	problemBased	6	Non-programming	non-programming	Explicit	multifaceted	THE	Non	36	Mixed	undergraduate
24	(Rodríguez-Martínez et al., 2020)	quasi-experiment	school	Mathematics	lecturing	9	Programming	Non-programming	Explicit	componential	INT	REF	47	Mixed	Grade 6
25	(Sung & Black, 2020)	quasi-experiment	after-school	NA	lecturing	5	programming	non-programming	Implicit	conceptual	INT	Non	134	Mixed	Grade 2-4
26	(Uzumcu & Bay, 2020)	Exploratory	school	NA	constructivism, collaboration	52	Non-programming	Non-programming	Explicit	componential	THE	Non	11	Mixed	undergraduate
27	(Werner et al., 2020)	Exploratory	after-school	NA	pairProgramming, rolePlaying, problemBased, gamemaking	24	programming	Programming	Implicit	conceptual	INT	Non	78	Mixed	middle school
28	(Yin et al., 2019)	Exploratory	camp	NA	scaffolding	44	programming and non-programming	non-programming	Explicit	componential	INT	Non	15	Mixed	high school
29	(Zha et al., 2020)	Exploratory	school	Educational Technology	flippedLearning, pairProgramming	NA	programming	Non-programming	Implicit	conceptual	INT	Non	15	Mixed	Undergraduate
30	(Allsop, 2019)	Exploratory	school	Computing	gamemaking	28	programming	programming	Defined	multifaceted	THE	Non	30	mixed	primary
31	(Baek, Wang, et al., 2019)	Exploratory	school	NA	scaffolding	10	Programming	Non-programming	Explicit	componential	ASS	REF	21	Mixed	Grade 2

32	(Baek, Yang, et al., 2019)	Exploratory	school	NA	collaboration	9.75	Programming	non-programming	Explicit	componential	THE	REF	122	Mixed	Grade 2
33	(Bers et al., 2019)	Exploratory	school	NA	storyTelling, lecturing, scaffolding	5	programming	programming	Implicit	componential	INT	Non	172	Mixed	Earlychildhood
34	(Chiazzese et al., 2019)	quasi-experiment	school	NA	projectBased, lecturing, peerCoaching, groupWork	8	programming	Non-programming	Explicit	componential	THE	REF	83	Mixed	Grade 3, 4
35	(Città et al., 2019)	Exploratory	School	NA	lecturing, debate, gamemaking	3	Non-programming	Non-programming	Implicit	componential	ASS	Non	92	Mixed	Grade 1 - 6
36	(Esteve et al., 2019)	Exploratory	school	Technology	Activitiesunplugged, collaboration	NA	programming	Non-programming	Explicit	componential	ASS	REF	114	Mixed	undergraduate
37	(Gabriele et al., 2019)	Exploratory	school	NA	lecturing, groupWork	16	Programming	Programming	Explicit	componential	THE	REF	141	Mixed	Undergraduate
38	(Garneli & Chorianopoulos, 2019)	Experimental	school	NA	gamemaking, collaboration, scaffolding, constructionism	12	Programming	Programming	Explicit	componential	ASS	REF	35	Mixed	middle school
39	(González-González et al., 2019)	Exploratory	school	NA	personalized	1	Programming	Programming	Implicit	componential	INT	Non	7	Mixed	special need
40	(Hsiao et al., 2019)	quasi-experiment	School	NA	lecturing, 6EModel	24	programming	Non-programming	Explicit	componential	ASS	REF	70	Mixed	Grade 6
41	(Ketenci et al., 2019)	Exploratory	school	NA	problemBased, scaffolding	6	programming	Non-programming	Explicit	componential	ASS	REF	142	Mixed	middle school
42	(Li et al., 2019)	Exploratory	camp	Science and Maths	modelling	NA	NA	Non-programming	NA	NA	NA	NA	28	NA	In-service Teacher
43	(Merkouris & Chorianopoulos, 2019)	Exploratory	school	NA	scaffolding, pairProgramming	5.25	Programming	Programming	Explicit	componential	THE	REF	36	Mixed	middle school
44	(Nam et al., 2019)	quasi-experiment	school	NA	lecturing, scaffolding	1.5	non-programming	non-programming	Explicit	componential	THE	Non	53	Mixed	Kindergarten
45	(Panskyi et al., 2019)	Exploratory	camp	NA	lecturing, Activitiesprogramming	18	Programming	Programming	Explicit	componential	ASS	REF	265	Mixed	primary and secondary
46	(Papadakis & Kalogiannakis, 2019)	Exploratory	school	Multimedia in Education	projectBased, collaboration	39	programming	Programming	Explicit	componential	ASS	REF	120	Mixed	undergraduate

47	(Sáez-López et al., 2019)	quasi-experiment	school	NA		NA	Programming	Programming	Implicit	componential	ASS	Non	93	Mixed	Grade 6
48	(Song, 2019)	Experimental	NA	Software Education	Lecturing	NA	Programming	Non-programming	Explicit	componential	ASS	REF	60	Mixed	Grade 3 - 6
49	(Taylor & Baek, 2019)	Experimental	school	Engineering class	lecturing	14	programming	non-programming	Explicit	componential	ASS	REF	191	Mixed	Grade 4,5
50	(Tran, 2019)	Exploratory	school	NA	pairProgramming	10	programming	non-programming	Explicit	componential	ASS	Non	263	Mixed	Grade 3
51	(Witherspoon & Schunn, 2019)	Exploratory	school	NA	lecturing, scaffolding	NA	programming	Non-programming	Implicit	conceptual	INT	Non	206	Mixed	middle school
52	(Wu et al., 2019)	Exploratory	school	Computer Science	lecturing, Activitiesprogramming	NA	programming	programming	Explicit	componential	ASS	REF	47	Mixed	college
53	(Zhao & Shute, 2019)	Exploratory	school	NA	gameplaying	3	programming	non-programming	Implicit	componential	INT	Non	69	NA	Grade 8
54	(Altanis et al., 2018)	Exploratory	after-school, school	NA	gamemaking	13.5	programming	Programming	Explicit	componential	ASS	REF	22	Mixed	Secondary
55	(Basogain et al., 2018)	Exploratory	school	NA	constructionism, feedback, peertopeer, portfolioDesign	20	programming	programming	Implicit	conceptual	INT	Non	NA	NA	NA
56	(Bati et al., 2018)	quasi-experiment	school	Science	lecturing	NA	Non-programming	Non-programming	Explicit	componential	ASS	REF	104	Mixed	Grade 8
57	(Garneli & Chorianopoulos, 2018)	Experimental	school	Physics	lecturing	14	Programming	Programming	Explicit	componential	ASS	REF	44	Mixed	middle school
58	(Kwon et al., 2018)	Exploratory	school	Computer Education	lecturing	NA	Programming	Programming	Explicit	componential	ASS	REF	23	Mixed	undergraduate
59	(Looi et al., 2018)	quasi-experiment	school	Computing	Activitiesunplugged	NA	non-programming	non-programming	Explicit	componential	THE	Non	35	Mixed	Grade 9
60	(Munoz et al., 2018)	Exploratory	camp	NA	gamemaking	15	programming	programming	Explicit	componential	ASS	REF	7	Male	NA
61	(Price & Price-Mohr, 2018)	Exploratory	NA	Story-Wirting/Literacy	lecturing	3	programming	programming	Implicit	componential	THE	Non	31	Mixed	primary
62	(Witherspoon et al., 2018)	Exploratory	school	NA	lecturing, constructionism	NA	programming	non-programming	Explicit	componential	ASS	Non	136	Mixed	Grade 6 and 8

63	(Yadav et al., 2018)	Exploratory	after-school, camp	Professional Development	inquiry, lecturing, reflection	NA	non-programming	non-programming	Explicit	conceptual	INT	Non	9	NA	In-service Teacher
64	(Atmatzidou & Demetriadis, 2017)	Experimental	school	Robotics	collaboration, problemSolving, gameBased	18	programming	Non-programming	Explicit	componential	THE	Non	77	Mixed	Grade 6
65	(Basu et al., 2017)	quasi-experiment	school	Science	Modelling, Scaffolding	15	Programming	Non-programming	Implicit	conceptual	INT	Non	98	Mixed	Grade 6
66	(Chen et al., 2017)	Exploratory	school	NA	lecturing	24	programming	non-programming	Explicit	componential	THE	REF	125	mixed	Grade 5
67	(Choi et al., 2017)	quasi-experiment	NA	NA	lecturing, puzzleSolving	48	Non-programming	Non-programming	NA	NA	NA	NA	88	Mixed	Grade 4 - 6
68	(Jaipal-Jamani & Angeli, 2017)	Exploratory	school	Science Method	collaboration, lecturing	6	programming	programming	Implicit	conceptual	INT	Non	21	mixed	undergraduate
69	(Witherspoon et al., 2017)	Exploratory	school	NA	constructivism, scaffolding, reflection	25	Programming	non-programming	Implicit	conceptual	INT	Non	441	Mixed	Grade 6, 7, 8
70	(Atmatzidou & Demetriadis, 2016)	Exploratory	school	Robotics	Activitiesrobotic, collaboration, scaffolding	22	programming	non-programming	Explicit	componential	THE	Non	164	Mixed	secondary
71	(Buffum et al., 2016)	Exploratory	school	Science elective	gameplaying	NA	Non-programming	non-programming	NA	NA	NA	NA	48	Mixed	Grade 7, middle school
72	(Leonard et al., 2016)	quasi-experiment	after-school	NA	lecturing, constructionism,	NA	Programming	programming	Explicit	componential	THE	REF	124	Mixed	Grade 5 - 8
73	(Mouza et al., 2016)	Exploratory	after-school	NA	problemSolving, Activitiesunplugged	13.5	programming	programming and non-programming	Implicit	conceptual	INT	Non	52	Mixed	Grade 4,5,6
74	(Sáez-López et al., 2016)	quasi-experiment	school	NA	problemBased, scaffolding	20	Programming	Non-programming	Explicit	componential	INT	REF	107	Mixed	Grade 6
75	(Zhong et al., 2015)	Exploratory	school	NA	storyTelling	12	programming	programming	Explicit	componential	THE	REF	144	Mixed	Grade 6
76	(Berland & Wilensky, 2015)	Experimental	school	NA	lecturing	NA	Programming	non-programming	Implicit	conceptual	INT	Non	78	Mixed	Grade 8
77	(Bers et al., 2014)	Exploratory	school	NA	gameplaying	9	programming	programming	Explicit	componential	THE	Non	63	Mixed	Kindergarten

78	(Denner et al., 2014)	Experimental	after-school	NA	pairProgramming, scaffolding	20	Programming	Programming	Explicit	componential	ASS	REF	320	Mixed	middle school
79	(Yadav et al., 2014)	Experimental	school	Psychology	simulation, lecturing, groupWork, rolePlaying	1.66	non-programming	non-programming	Explicit	componential	INT	Non	357	Mixed	undergraduate
80	(Kim et al., 2013)	Experimental	school	NA	lecturing	30	Non-programming	Non-programming	Explicit	conceptual	THE	Non	132	Mixed	undergraduate
81	(Libeskind-Hadas & Bush, 2013)	Exploratory	school	BioScience	Activitieslab, lecturing	45	programming	programming	Implicit	conceptual	INT	Non	40	Mixed	college

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