Appendix I: Summary table on educational and game design aspects in studies on educational escape rooms	

Authors	Motivation implementation	Target- group	Disci- pline	Learning objectives	Positioning in course curriculum	Role teacher and staff	Puzzle pathway	Game organisation	Team size	Play- time (min.)	IT tools
Adams, Burger, Crawford, & Setter, 2018	To explore an active learning environment using GBL and adult learning theory, to motivate and engage students in order to develop TWS, communication skills and critical thinking.	PD&HE	MED	To demonstrate content knowledge and related skills, to develop TWS, com. skills and critical thinking.	Formative assessment.	Monitoring & guiding in room: assess performed skills. Hint system: 3 free, more hints - > time penalty. Debriefing: 2, 4.	U	One team	6-14	60	Ν
Arnal et al., 2019	To demonstrate a teaching environment using collaborative learning for future career, to motivate and engage students towards maths.	HE	STEM	To foster content knowledge and related skills (e.g., mathematical reasoning), to use TWS, awareness of possibilities ER as educational environment.	U	Monitoring & guiding in room: hints.	U	All teams	U	U	Y
Borrego, Fernández, Blanes, & Robles, 2017	To explore an environment to motivate students, to foster learning.	HE	STEM	To demonstrate and foster content knowledge and related skills.	In addition to lectures.	Monitoring from adjacent room.	Η	One team	U	60	Y
Boysen Osborn, Paradise, & Suchard, 2018	To explore an environment to increase students' engagement and foster medical knowledge and teambuilding.	HE	MED	To demonstrate and foster content knowledge and related skill (e.g. recognize poisonings related to course content).	Formative assessment; midterm exam.	Monitoring in room, no hints. Debriefing: 3, 4.	S	All teams	5	60	N
Brown, Darby, & Coronel, 2019	To explore an active learning environment for urosepsis simulation.	HE	MED	To foster content knowledge and related skills (e.g. administration proper medicines, interpreting lab results).	In addition to lectures.	Monitoring & guiding in room: hints. Hint system: one hint card. Debriefing: 2, 4, 7.	S	One team	6-8	60	Y

Cain, 2019	To explore an active learning environment, to increase students' engagement and prevent free riding in group work.	НЕ	MED	To foster content knowledge and related skills.	In addition to lectures.	Monitoring & guiding in room: Hint system: 1 free hint, more needed: time penalty. Hint also given to groups lagging behind. Debriefing: 1, 4.	S	All teams.	5-6	45	Y
Carrión et al., 2018	To explore GBL, enhancing active learning, increase students' engagement and foster medical knowledge.	HE	MED	To assess content knowledge and related skills, to integrate content knowledge of two different subjects, to practice English.	Formative assessment; prior to exam.	Monitoring & guiding in room: role GM, encouraging to work as a team.	S	Two teams parallel in same room.	14-16	60	Ν
Clarke et al., 2017	to evaluate a design framework for educational ERs, the feasibility of the ER and acceptance of staff.	HE	OTH	To foster communication strategies and skills, leadership, TWS.	Stand alone.	Monitoring from adjacent room.	U	One team.	3-6	20	Y
Clauson et al., 2019	To explore an environment to assess student readiness for advanced pharmacy practice experiences, while developing TWS, problem solving, critical thinking.	HE	MED	To assess content knowledge and related skills and TWS, critical thinking, problem solving, to develop reasoning skills.	Formative assessment; prior to exam.	Monitoring, observing & guiding in room. Hint system 1 free hint, more needed - > time penalty. Debriefing: 2, 3, 4, 6.	S	Two teams in different rooms.	5-6	60	Ν
Cotner, Smith, Simpson, Burgess, & Cain, 2018	To explore an active learning environment.	HE	MED	To foster content knowledge and related skills.	In addition to classes.	U	U	U	U	U	U
Craig, Ngondo, Devlin, & Scharlach, 2019	To explore an environment to foster course subject, and to increase TWS and students' ability to work in time.	HE	ОТН	To foster content knowledge: (communication strategies), and related course skills (communication, TWS) and ability to work in time.	Stand alone.	Monitoring in room. Debriefing: 4, 6, 7.	Р	One team.	4-6	30	Ν

Dietrich, 2018	To explore active learning strategy using GBL to motivate and engage students in order to develop TWS, comm skills.	HE	STEM	To demonstrate and extent content knowledge and skills, develop communication skills and TWS.	In addition to lectures.	Monitoring in room. Debriefing: 4, 5.	S	All teams.	5-7	60	Ν
Eukel, Frenzel, & Cernusca, 2017	To explore a form of GBL, to foster knowledge.	HE	MED	To foster content knowledge and related skills, using TWS.	In addition to lectures.	Monitoring & assess on performed skills from adjacent room. Hint system: 4 pre-set hint cards.	S	One team.	5	75	J
Ferreiro- González et al., 2019	To explore GBL, to foster active learning, and to motivate and engage students.	HE	STEM	To foster content knowledge and related skills (e.g. analytic thinking).	In addition to lectures & practicals.	Monitoring & guiding in room, by use of characters answering questions.	Н	One team.	6-10	60	Y
Franco & DeLuca, 2019	To explore an activity with active learning approach to simulate interdisciplinary teamwork environment, to foster critical thinking and problem solving.	HE	MED	To assess and develop teamwork, critical thinking, problem solving, leadership.	Formative assessment; midterm exam.	Monitoring, observing for feedback & assessing in room. Hint system: 2 free hints. Debriefing: 1, 2, 6, 7.	S	All teams.	6	90*	Y
Friedrich, Teaford, Taubenheim, Boland, & Sick, 2019	To explore GBL to engage students, to foster learning and communication skills	HE	MED	Awareness of importance of interprofessional communication and to develop interprofessional communication, and TWS.	Stand alone.	Monitoring in room. Debriefing: 4, 5, 7.	S	One team.	8	45	N
Giang et al., 2018	To explore an environment to motivate and engage students.	ALL	STEM	To get introduced to new subject and related skills, to develop problem solving skills.	Stand alone.	Monitoring, observing & guiding in room: role GM, providing hints. Debriefing: 3, 4, 6.	Р	One team.	3-5	30	Y
Glavaš & Stašcik, 2017	To demonstrate a teaching environment to motivate and engage students towards maths.	HE	STEM	Awareness of possibilities ER as educational environment.	U	Debriefing: 2.	U	One team.	4-5	60	Y

Gómez- Urquiza et al., 2019	To explore an environment to assess theoretical and practical knowledge.	HE	MED	To assess content knowledge and related skills, to develop TWS and performing under pressure.	Formative assessment.	Monitoring, assessing performed skills & guiding: hints in room. Hint system: 2 free hints.	U	One team.	5	30	Y
Gordon, 2017	To explore an active learning strategy, to foster collaborative learning, to motivate and engage students.	HE	MED	To acquire new content knowledge and skills, to develop TWS.	Introduction to new subject.	Debriefing: 2, 4.	S	One team.	U	U	N
Guigon, Humeau, & Vermeulen, 2018	To evaluate a design framework for educational ERs, to motivate students by active learning.	HE	STEM	To foster content knowledge and skills.	In addition to lectures.	Monitoring & guiding in room, in a way that teams make same progression, verifying reasoning. Debriefing: 3, 4, 7.	Н	Two teams in different rooms.	5	90	Υ
Healy, 2019	To explore an active learning strategy to inform students on the study entomology in engaging way.	SE	STEM	To get introduced to new subject and related skills, to develop TWS, communication skills and problem solving.	Stand alone.	Hint system: 4 free hints. Debriefing: 3, 4, 5.	S	All teams.	5	60	N
Hermanns et al., 2018	To explore an active learning strategy to engage students.	HE	MED	To foster content knowledge and related skill, to develop TWS, com. skills, problem solving and critical thinking.	U	Monitoring in room. Debriefing: to increase understanding, 2.	S	All teams.	4-5	60	Y
Но, 2018	To explore a learning environment to motivate and engage students, foster content knowledge and skills.	HE	STEM	To foster content knowledge and skill, to develop critical thinking.	In addition to class.	Monitoring in room. Hint system: pre-set hints. Debriefing	Η	All teams.	4-5	60	Y
Järveläinen & Paavilainen- Mäntymäki, 2019	To research learning strategies in groups, to motivate students by active learning.	HE	STEM	To assess content knowledge and related skills.	Assessment: prior to final exam.	Monitoring & guiding in room: affirm, hints and direct instructions.	S	One team.	4-6	45	Y

Kinio, Dufresne, Brandys, & Jetty, 2019	To explore with a learning environment to activate and motivate and engage students in job related roles.	HE	MED	To foster content knowledge and related skills.	In addition to lectures.	U	U	U	3-4	60	N
López, 2019	To explore an active learning activity to motivate an engage students.	HE	STEM	To assess content knowledge and related skills, to develop TWS.	Formative assessment; prior to exam.	Monitoring & guiding in room: hints. Hint system: hints unlimited, received after small test which takes time.	Н	All teams.	2	120	Y
Mills & King, 2019	To explore with active and exploratory learning.	HE	OTH	To acquire new content knowledge and related skills.	Start of higher education.	Monitoring and guiding from adjacent room, as GM: feedback and hints. Debriefing: 1, 7.	U	One team.	4	60	Y
Monaghan & Nicholson, 2017	To explore an active learning environment, to foster collaborative learning.	HE	MED	To foster and extent content knowledge and related skills; use TWS, problem solving skills, awareness of frequency and risks of sepsis, awareness of framing patients.	In addition to lectures.	Monitoring & guiding in room, by use of characters: check solutions, provide key to new puzzle. Debriefing: 4, 7.	S	All teams.	<5	60	Y
Morrell & Ball, 2019	To explore an active learning environment based on adult learning principles, to increase student engagement.	HE	MED	To formative assess content knowledge and skills, use TWS.	Formative assessment.	Monitoring, assess & guiding: check solutions, indicate how to continue. Hint system: 3 free hint. Debriefing: 3, 6, 7.	S	All teams; need to cooperate to unfold next layer of puzzles.	U	60	Y
Mosley, Rogers, & Smith, 2018	To explore an active learning environment for simulations.	PD	MED	To acquire new content knowledge and related skills, situational awareness, awareness of confirmation bias.	Stand alone.	Debriefing: 4.	U	One team.	U	60	N
Nelson, Calandrella, Schmalbach, & Palmieri, 2017	To explore a problem-based active learning environment.	HE	MED	To foster content knowledge and related skills, use problem solving skills.	Stand alone.	Guiding: hints provided.	S	One team.	6-8	80	Y

Peleg, Yayon, Katchevich, Moria- Shipony, & Blonder, 2019	To explore an active learning environment using collaborative learning, to motivate and engage student, to bridge gap classroom and real world while developing TWS.	SE	STEM	To foster content knowledge and related skills, to develop observation skills.	U	Monitoring & guiding: hints for teams lagging behind. Debriefing: 2, 3, 4.	Η	All teams; need to cooperate for last puzzle.	4-6	60	N
Seto, 2018	To explore an active learning environment for simulation training of TWS.	HE	MED	To develop TWS, to reflect on one's functioning, and to set developmental goals.	U	Debriefing: 7.	U	One team.	5	30	Ν
Styling, Welton, Milijasevic, Peterson, & Sia, 2018	To explore an environment to engage participants, to raise awareness around patient safety and required practices using collaborative learning.	PD	MED	Awareness of patient safety and required practices, to acquire new content knowledge and related skills, using TWS.	Stand alone.	U	S	One team.	U	U	Ν
Vergne, Simmons, & Bowen, 2019	To explore an active learning environment using collaborative learning, to motivate and engage student, to foster lab skills, critical thinking, problem solving, and TWS.	HE	STEM	To assess content knowledge and related skills, to develop critical thinking, problem solving, and TWS.	Formative assessment; end of semester.	Hint system: two free, 3 -> time penalty. Debriefing: 4	S	One team.	4-6	60	Ν
Vörös & Sárközi, 2017	To explore an active learning environment using GBL to motivate and engage students in order to develop knowledge, TWS, com. skills and problem solving.	SE	STEM	To get introduced to new content knowledge and related skills, to develop TWS, comm. skills and problem solving.	Stand alone.	Monitoring & guiding in room, by use of characters. Debriefing: 2, 4.	S	All teams.	4-6	90	Ν
Watermeier & Salzameda, 2019	To explore an active learning environment to review knowledge, to engage students with different learning styles using problem solving skills.	HE	STEM	To assess content knowledge and related skills, to develop problem solving and TWS.	Formative assessment: prior to exam.	Monitoring & guiding: hints per station after time span to prevent lagging behind, or on request.	Н	One team.	4	60	Ν
Wu, C., Wagenschutz, H., Hein, J.	To explore learning environment using experiential and collaborative learning.	HE	MED	To foster leadership competencies: leading self, communication skills, problem-solving, TWS, systems thinking, to positively impact the team's connection, in bioh generative interview.	U	Debriefing: 4, 7.	U	U	7-10	U	Ν

in high-pressure situation.

*Note:* U = data unknown; GBL = game based learning; TWS = teamwork skills; PD = professional development; HE = higher education; MED = medical studies; STEM = science, technology, engineering and mathematics; ER = escape room; H = hybrid pathway; P = path-based pathway; S = sequential pathway; N = no; Y = yes; the column 'team size' indicated in italics which team size numbers were reduced after evaluation of the game.