



Instruments for measuring self-directed learning and self-regulated learning in health professions education: a systematic review

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Society of Directors of Research in Medical Education

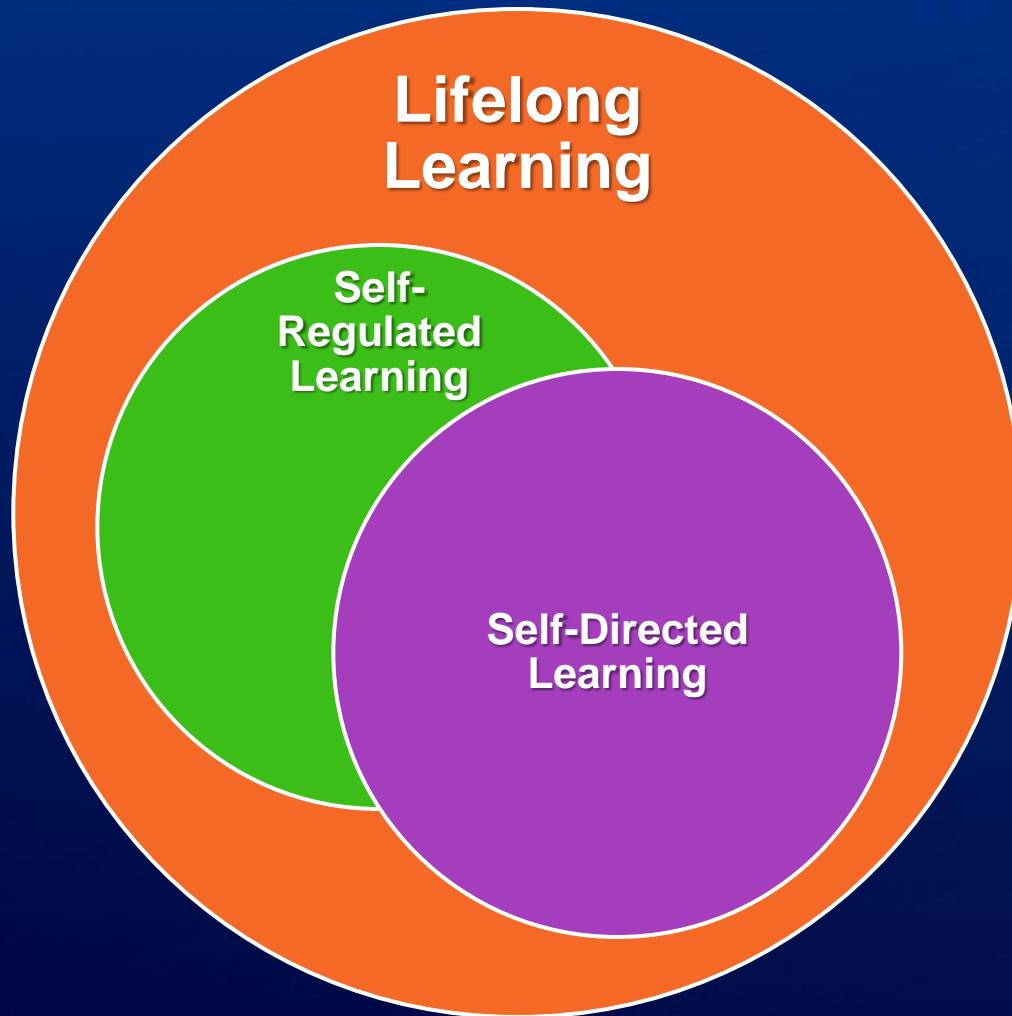
Monday, May 22nd 2017

Co-investigators

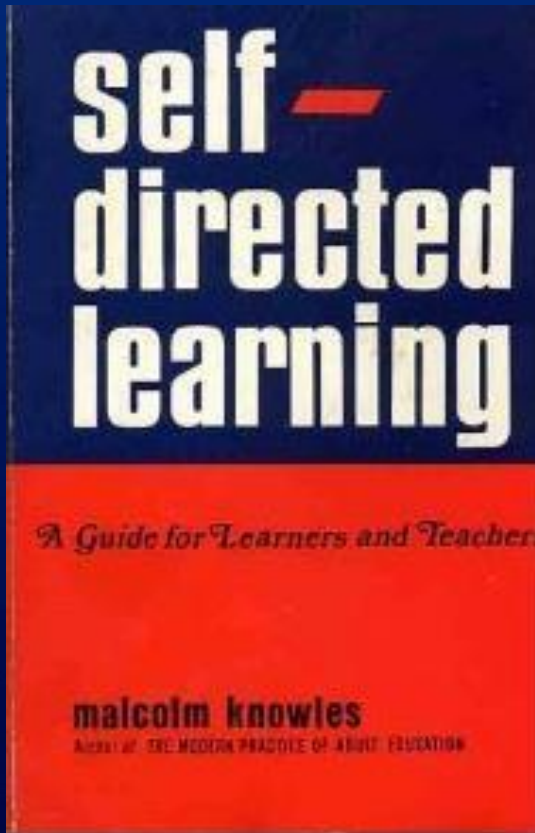
- John Ratelle, MD
- Chris Stephenson, MD
- Tom Beckman, MD
- Ryan Brydges, PhD
- Dave Cook, MD MHPE

“A physician shall continue to study, apply, and advance scientific knowledge, maintain a commitment to medical education, make relevant information available to patients, colleagues, and the public, obtain consultation, and use the talents of other health professionals when indicated.”

-AMA Principles of Medical Ethics



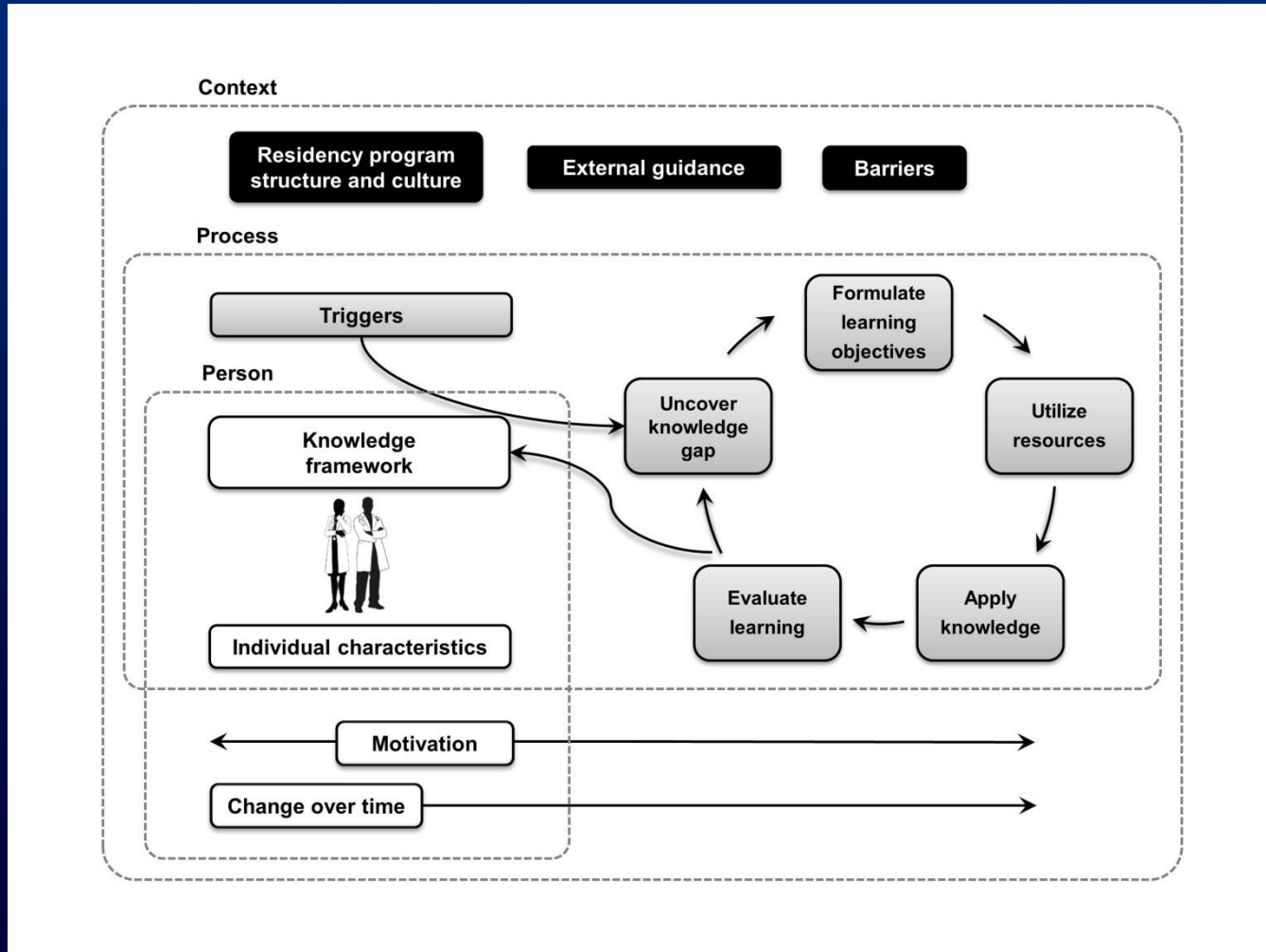
What is Self-Directed Learning (SDL)?



Self-directed learning is “a process in which individuals take the initiative with or without the help of others, in diagnosing their learning needs, formulating goals, identifying human and material resources for learning, choosing and implementing appropriate learning strategies, and evaluating learning outcomes.”

Knowles M. Self-directed learning: A guide for learners and teachers. 1975.

What is Self-Directed Learning (SDL)?

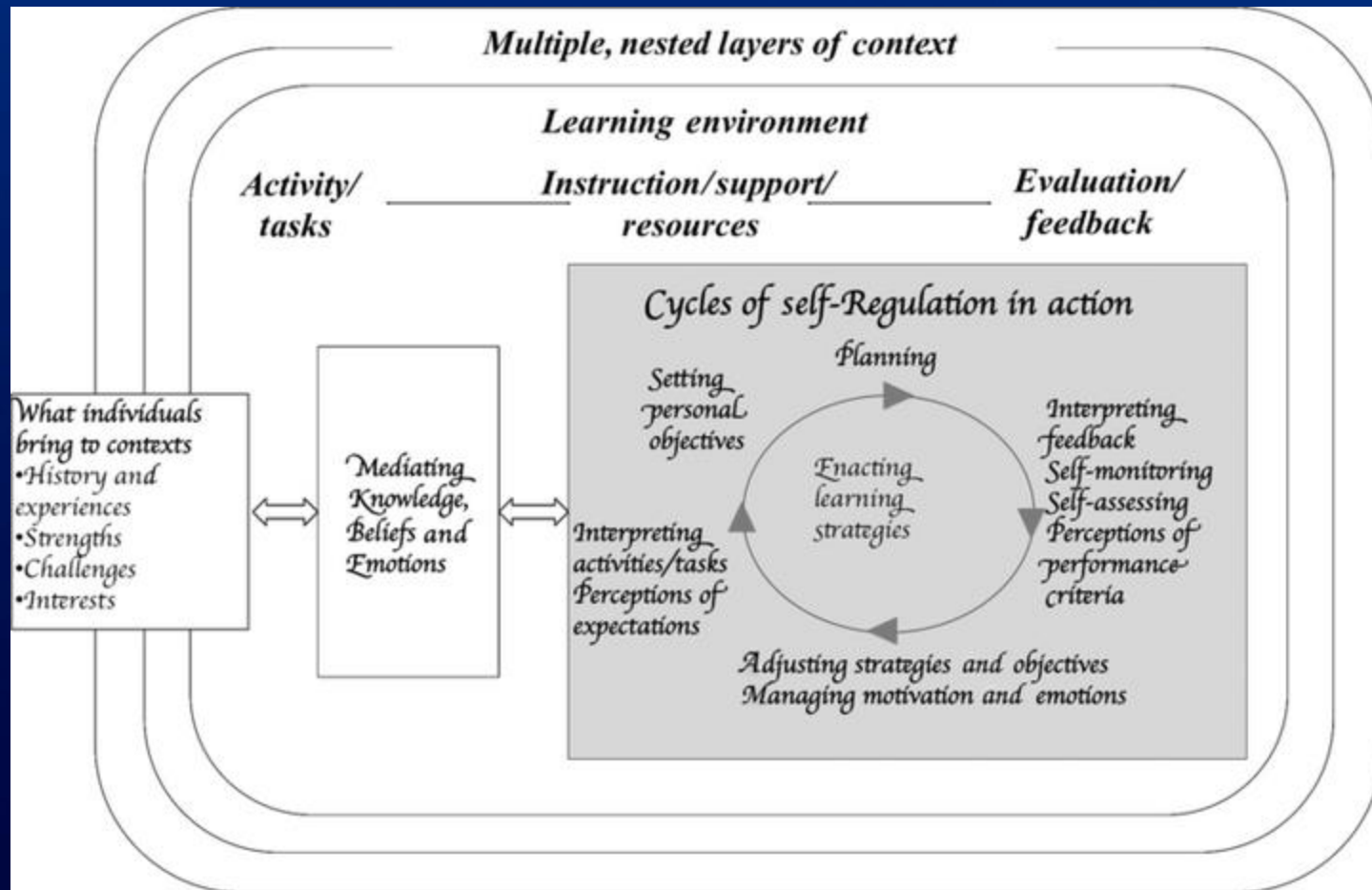


What is Self-Regulated Learning (SRL)?

“The key issue defining learning as self-regulated is not whether it is socially isolated, but rather whether the learner displays personal initiative, perseverance and adaptive skill in pursuing it.”

Zimmerman BJ and Schunk. Self-Regulated Learning and Academic Achievement: Theoretical Perspectives. 2001.

What is Self-Regulated Learning (SRL)?



Brydges R et al. Med Educ. 2012;46(1):71-9.

What is known?

- SDL in HPE is associated with moderate improvement in knowledge compared to traditional teaching methods, particular for more advanced learners.
- SDL is poorly defined, has many proposed benefits but is inconsistently implemented
- SRL supports in simulation-based training can improve learning

Murad MH et al. Med Educ. 2010;44(11):1057-68.

O'Shea E. J Adv Nurs. 2003;43(1):62-70.

Brydges et al. Med Educ. 2015;49(4):368-78.

Measurement Tools

- Multiple measures of SDL and SRL
- Previously categorized as aptitude versus event
- **Gap:** No previous systematic review outlining their optimal use in HPE

Aptitude versus Event

Aptitude: “...aptitude is not limited to intelligence or some fixed list of differential abilities but includes personality and motivational differences along with styles, attitudes, and beliefs.”

Event: “...the very actions learners perform rather than descriptions of those actions or of mental states that actions generate.”

Purpose

- Catalog measures of SDL and SRL that have been used in health professions education
- Summarize the validity evidence for the use of SDL and SRL measures in health professions education research
- Identify differences between measures used for aptitude and event, and define their roles in assessment
- Assess the role of SDL and SRL measures to:
 - Predict future achievement
 - Change over time

Methods

- Systematic review
- Search strategy (Fall 2015—will be updated)
 - Reference librarian
 - Ovid MEDLINE, Ovid EMBASE, Ovid PsycInfo, CINAHL, ERIC and Scopus
 - Search terms: self-direct*, self-regulat*, “self study. professional, skill*, learn* in the title, feedback, evaluat*, assess*, performance,” metacogn*, simulat*, expertise, coach*, develop*, advanced “procedural skill*”, and nontechnical skill*

Methods

- Abstract review in duplicate
- Full-length article review in duplicate
- Inclusion criteria:
 - Original research
 - Full-length manuscript
 - Health professions trainees or professionals in medicine, nursing, NP/PA, pharmacy or PT/OT
 - Measure of SDL or SRL

Methods

- Data extraction done in duplicate
 - Participant type and number
 - Geographic location
 - SDL or SRL measure, domains/items, aptitude/event
 - Validity evidence (Messick): content, response process, internal structure, relations to other variables, consequences
 - Study quality: MERSQI

Potentially relevant studies
from database search
(n=3543 articles)

Studies excluded by research librarian (n=933)

Studies included for abstract
review (n=2610 articles)

Studies excluded (n=2337)

- Not original research (816)
- No health professions learners (386)
- No measure of self-directed or self-regulated learning (1135)

Studies included for full
manuscript review (n=273
articles)

Studies excluded (n=116)

- Not original research (6)
- No health professions learners (8)
- No measure of self-directed or self-regulated learning (82)
- Abstract only (9)
- Duplicate reports of previously published data (5)
- Not available in English (5)
- Other (1)

Studies included for
systematic review (n=157
articles)

Characteristics of Included Studies

Study Characteristics	No. of Studies	No. of Participants
All Studies	157	42,400
Participants*		
Nursing Students	58	20,525
Nurses in Practice	19	2,443
Medical Students	49	13,888
Physicians in Postgraduate Training	18	2,872
Physicians in Practice	5	332
Physical or Occupational Therapy Students	11	892
Pharmacy Students	5	493
Nurse Practitioner/Physician Assistant Students	2	226
Pharmacists in Practice	1	73
Other	5	656

Characteristics of Included Studies

Study Characteristics	No. of Studies	No. of Participants
Geographical Locations		
North and South America	86	14,484
USA	67	12,113
Canada	15	1,779
Other	4	592
Asia	41	18,468
Europe	21	7,365
UK	7	981
Other	14	6,384
Australia	9	2,083

Characteristics of Included Studies

Study Characteristics	No. of Studies	No. of Participants
Topic†		
Self-Directed Learning	121	33,530
Self-Regulated Learning	37	8,910
Study Design		
Single group cross-sectional or single group posttest only	86	29,018
Single group pretest and posttest	25	4,393
Non-randomized, 2 group	39	8,467
Randomized controlled trial	7	522
Quality		
Medical Education Research Study Quality Instrument <12 point	74	20,936
Medical Education Research Study Quality Instrument ≥12 point	83	21,464

Measures of Self-Directed Learning

Measure	No. of Stud.	No. of Part.	Participant Types	Domains, Items	Aptitude vs. Event	Mean MERSQI
Self-Directed Learning Readiness Scale (SDLRS)	40	7,338	Nursing, Medicine, PT/OT, NP/PA	8,58	Aptitude	11.9
SDLRS-Nursing Education (SDLRS-NE)	25	4,731	Nursing, Medicine, Pharmacy, PT/OT	3,40	Aptitude	11.3
Self-Directed Learning Inventory (SDLI)	7	11,517	Nursing	4,20	Aptitude	12.4
Self-Rating Scale of Self-Directed Learning (SRSSDL)	5	2,253	Nursing	5,60	Aptitude	11.8
Oddi Continuous Learning Inventory (OCLI)	5	929	Nursing, Medicine	3,24	Aptitude	11.6
Autonomous Learner Index (ALI)	2	462	Nursing	2,24	Aptitude	13.8

Measures of Self-Directed Learning

Measure	Validity Evidence				
	Content	Response Process	Internal Structure	Relations	Consequences
Self-Directed Learning Readiness Scale (SDLRS)	40	1	16	38	0
SDLRS-Nursing Education (SDLRS-NE)	25	1	15	22	0
Self-Directed Learning Inventory (SDLI)	7	0	4	6	0
Self-Rating Scale of Self-Directed Learning (SRSSDL)	5	0	4	4	0
Oddi Continuous Learning Inventory (OCLI)	5	0	3	4	0
Autonomous Learner Index (ALI)	2	0	1	2	0

Measures of Self-Regulated Learning

Measure	No. of Stud.	No. of Part.	Participant Types	Domains, Items	Aptitude vs. Event	Mean MERSQI
Motivated Strategies for Learning Questionnaire (MSLQ)	15	5,984	Nursing, Medicine, Pharmacy, PT/OT	2,81	Aptitude	13.1
Verbal Protocol Analysis	5	180	Nursing	3	Event	13.4
Self-Regulated Learning Inventory	1	121	Nursing	3,65	Aptitude	14.5
Self-Regulated Learning Microanalytic Approach	1	71	Medicine	3	Event	13
Self-Efficacy for Self-Regulated Learning	1	148	Pharmacy	5,27	Aptitude/Event	13

Measures of Self-Regulated Learning

Measure	Validity Evidence				
	Content	Response Process	Internal Structure	Relations	Consequences
Motivated Strategies for Learning Questionnaire (MSLQ)	15	0	13	15	0
Verbal Protocol Analysis	5	0	5	4	0
Self-Regulated Learning Inventory	1	0	1	1	0
Self-Regulated Learning Microanalytic Approach	1	0	1	1	0
Self-Efficacy for Self-Regulated Learning	1	0	0	1	0

Next Steps

- Directionality of validity evidence
- Data synthesis
 - Do measures of SDL or SRL predict future achievement?
 - Do measures of SDL or SRL change over time?
 - Are there differences between
 - measures of SDL and SRL?
 - measures of aptitude and event?

Discussion

- We identified 157 articles outlining measures of self-directed and self-regulated learning
- We created a catalog of measurement tools
 - Characteristics of measurement
 - Populations studied
 - Aptitude versus event
 - Study quality, validity evidence
- Seeking to answer questions about predictive validity, change over time
- How should these tools be used in assessment?

Limitations

- Broad search criteria, concern that will miss studies not explicitly labeled SDL or SRL
- Data reporting varies dramatically, difficult to make strong conclusions/recommendations

Conclusions

- Self-directed and self-regulated learning is broadly studied in HPE
- Measurement tools have strong evidence for content and internal structure validity
- Relations to other variables validity evidence is variable



Questions & Discussion