First-Year STEM College Students' Use of Study Strategies Including Notetaking

Kadir Kozan – kkozan@fsu.edu

PURPOSE & OVERVIEW

- Understanding first-year STEM college students' use of study strategies including notetaking.
- It uniquely focuses on STEM students but is limited to college students in the U.S.
- How to get STEM students to learn better and enhance their performance; but, the strategies generally require more mental effort.
- What technologies can help us overcome the challenges of applying effective strategies?

METHODS

- Mixed Methods: (1) Likert-type survey on a 0 [not at all/never] – 10 [effective/always] scale with qualitative open-ended questions distributed through Qualtrics; (2) Semi-structured Interviews
- Setting & Sample: First-year STEM college students in the US from various STEM fields ranging from engineering to biological sciences

Strategies

SE[1] I reread/rewatch/relisten to the target content several times with time intervals in between.

RI[2] I consecutively reread/rewatch/relisten to the target content several times.

RE[3] I try to remember what I have read/watched/listened to before rereading/rewatching/relistening.

RI[4] I highlight the whole sentences, paragraphs, and phrases while reading for the first time.

RE[5] I highlight important parts of sentences, paragraphs, or phrases after first reading.

RE[6] I create explanations for things that are true or not.

RE[7] I explain how things are related to each other or how I solve a problem to myself.

RE[8] I write summaries of the target content.

RI[9] I underline whole sentences and paragraphs while reading.

RE[10] I underline important parts of sentences or paragraphs while reading.

RE[11] I attempt to create mental images of the target content I read or listen to.

RE[12] I take practice tests over the target content.

RE[13] I test myself or use self-testing over the target content.

RE[14] I practice retrieving information from each class NOT immediately but after some time, and then I retrieve the same information several times in the future again.

RE[15] After retrieving information from the most recent class, I also practice retrieving earlier important information.

RE[16] In a single study session, I work on different topics, problems, or materials.

RE[17] I draw various simple to complex visuals (e.g., timelines, graphics, infographics) that correspond to the target content.

RE[18] I explain visuals in my own words and compare it with the target content.

RE[19] I create concrete examples as they related to the target content.

RE[20] I use some memory aids (e.g., acronym, keywords, songs) to learn the target content.

SE[21] I revisit highlighted or underlined text parts later.

RI[22] I take verbatim notes in classes.

RE[23] I take notes on important points in class.

RI[24] I take verbatim notes while learning for fun.

RE[25] I take notes on important information while learning for fun.

RE[26] I analyze worked examples.

RI[27] I generally study for exams/quizzes/tests in the last few days.

RE[28] I create concept maps related to the target content.

RE[29] I use visuals and corresponding verbal information in my notes.

SE[30] I revisit my notes taken several times with time intervals in between later.

SE[31] I review what I highlight and/or underline later.

RE[32] I take notes in a way to express critical points in fewer words.

RE[33] My notetaking includes summarization, paraphrasing or using my own words.

RESULTS

Number of Students Using Strategies for Different Purposes
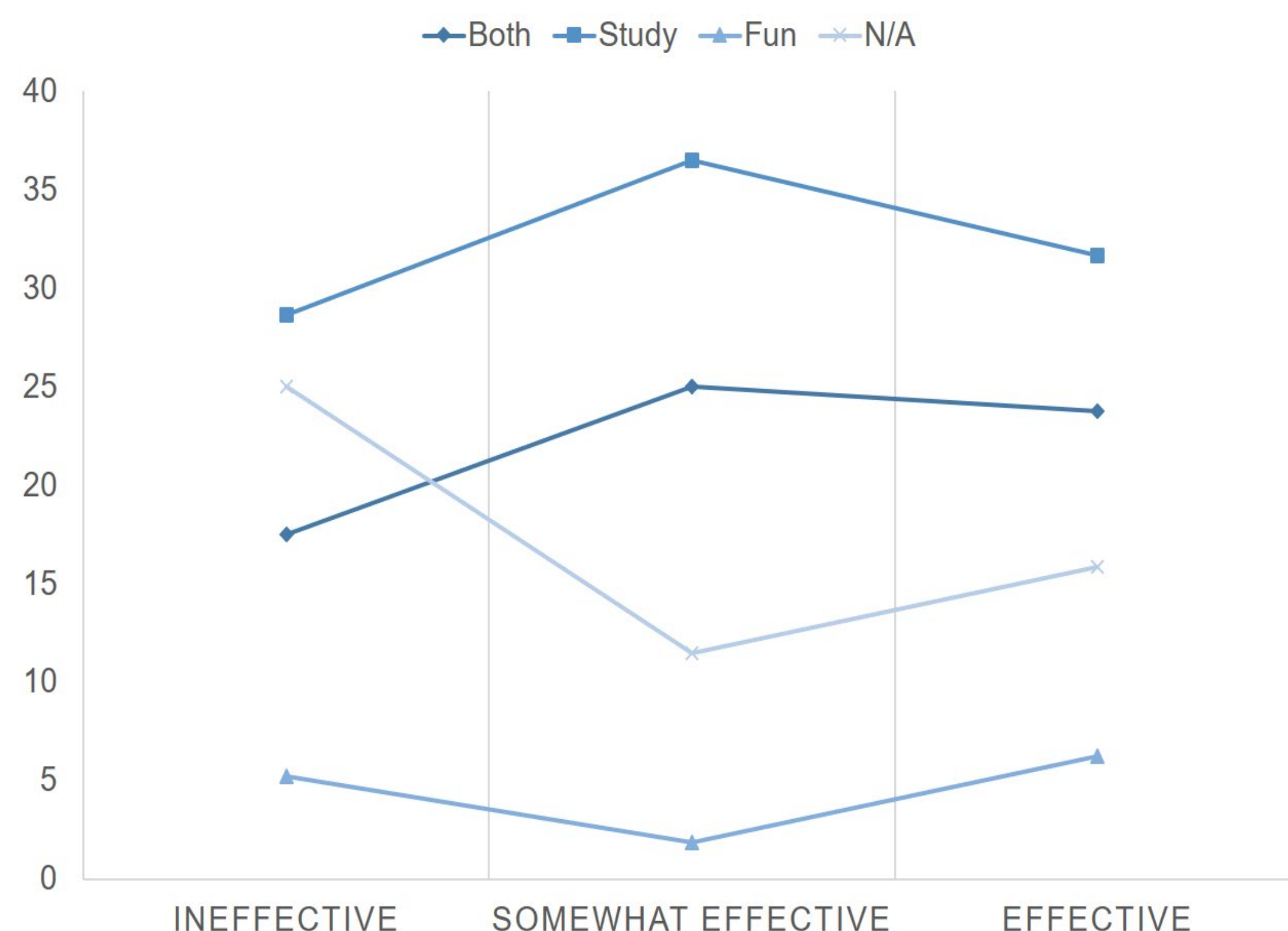
Purposes, Frequency of Use, & Effectiveness

Category	SS #	Both	Study	Fun	No use	Freq. M	Freq. SD	Eff. M	Eff. SD
Somewhat effective	1	25 (32.05%)	43 (55.13%)	7 (8.97%)	3 (3.85%)	6.87	2.84	6.78	2.83
	21	25 (32.89%)	33 (43.42%)	4 (5.26%)	14 (18.42%)	5.49	3.26	5.41	3.21
	30	23 (29.49%)	39 (50.00%)	3 (3.85%)	13 (16.67%)	5.57	3.31	5.49	3.25
	31	27 (35.06%)	31 (40.26%)	3 (3.90%)	16 (20.78%)	5.44	3.52	5.35	3.46
Relatively ineffective	2	25 (32.47%)	30 (38.96%)	4 (5.19%)	18 (23.38%)	5.41	3.47	5.32	3.41
	4	21 (26.92%)	29 (37.18%)	1 (1.28%)	27 (34.62%)	4.88	3.64	4.8	3.57
	9	15 (19.48%)	22 (28.57%)	5 (6.49%)	35 (45.45%)	3.96	3.74	3.88	3.65
	22	13 (16.88%)	38 (49.35%)	4 (5.19%)	22 (28.57%)	4.92	3.67	4.84	3.6
	24	13 (17.11%)	3 (3.95%)	16 (21.05%)	44 (57.89%)	3.23	3.74	3.15	3.63
	27	18 (23.68%)	50 (65.79%)	4 (5.26%)	4 (5.26%)	7.29	2.93	7.26	2.94
Relatively effective	3	43 (56.58%)	27 (35.53%)	5 (6.58%)	1 (1.32%)	6.66	2.69	6.7	2.6
	5	26 (33.33%)	33 (42.31%)	5 (6.41%)	14 (17.95%)	5.75	3.29	5.67	3.24
	6	23 (30.26%)	25 (32.89%)	5 (6.58%)	23 (30.26%)	5.12	3.61	5.04	3.54
	7	34 (44.16%)	29 (37.66%)	5 (6.4%)	9 (11.69%)	6.59	2.97	6.5	2.95
	8	18 (24.00%)	31 (41.33%)	4 (5.33%)	22 (29.33%)	5.09	3.51	5.01	3.44
	10	21 (27.63%)	29 (38.16%)	4 (5.26%)	22 (28.95%)	4.91	3.57	4.82	3.5
	11	39 (50.00%)	21 (26.92%)	8 (10.26%)	10 (12.82%)	6.19	3.29	6.11	3.25
	12	18 (23.38%)	54 (70.13%)	1 (1.30%)	4 (5.19%)	7.69	2.42	7.66	2.46
	13	27 (36.49%)	38 (51.35%)	3 (4.05%)	6 (8.11%)	7.31	2.87	7.28	2.88
	14	22 (28.57%)	38 (49.35%)	3 (3.90%)	14 (18.18%)	5.59	3.19	5.5	3.14
	15	18 (23.38%)	40 (51.95%)	4 (5.19%)	15 (19.48%)	5.08	3.15	4.99	3.08
	16	15 (19.48%)	42 (54.55%)	3 (3.90%)	17 (22.08%)	5.48	3.17	5.46	3.16
	17	19 (24.68%)	25 (32.47%)	6 (7.79%)	27 (35.06%)	4.47	3.61	4.38	3.53
	18	24 (31.17%)	28 (36.36%)	7 (9.09%)	18 (23.38%)	5.18	3.62	5.1	3.56
	19	23 (30.26%)	32 (42.11%)	8 (10.53%)	13 (17.11%)	5.45	3.27	5.36	3.22
	20	31 (40.26%)	25 (32.47%)	3 (3.9%)	18 (23.38%)	5.45	3.78	5.37	3.72
	23	17 (21.79%)	55 (70.51%)	4 (5.13%)	2 (2.56%)	7.19	2.79	7.1	2.8
	25	11 (14.10%)	4 (5.13%)	33 (42.31%)	30 (38.46%)	4.41	3.79	4.33	3.71
	26	30 (38.96%)	35 (45.45%)	3 (3.90%)	9 (11.69%)	6.37	2.81	6.34	2.82
	28	8 (10.53%)	16 (21.05%)	2 (2.63%)	50 (65.79%)	2.7	3.49	2.68	3.45
	29	20 (25.64%)	32 (41.03%)	4 (5.13%)	22 (28.21%)	4.74	3.27	4.65	3.2
	32	30 (38.96%)	33 (42.86%)	4 (5.19%)	10 (12.99%)	6.12	3.26	6.09	3.25
	33	29 (37.66%)	36 (46.75%)	3 (3.90%)	9 (11.69%)	6.54	3.02	6.51	3.02

Correlations for Overall Data ($N = 78$)

[*]$p < .001$ (1-tailed)	1 (r_s)	2 (r_s)
1 Effectiveness	-	
2 Frequency	.700[*] (.660[*])	-

Correlations for Relatively Effective Data

[*]$p < .001$ (1-tailed)	1 (r_s)	2 (r_s)
1 Effectiveness	-	
2 Frequency	.638[*] (.593[*])	-

Correlations for Somewhat Effective Data

[*]$p < .001$ (1-tailed)	1 (r_s)	2 (r_s)
1 Effectiveness	-	
2 Frequency	.774[*] (.763[*])	-

Correlations for Relatively Ineffective Data

[*]$p < .001$ (1-tailed)	1 (r_s)	2 (r_s)
1 Effectiveness	-	
2 Frequency	.806[*] (.754[*])	-

Type	Measure	Possible Min.	Min.	Possible Max.	Max.	Mean	SD	Median
Relatively Effective SS	Effectiveness	0	57	230	230	157	38.4	160
	Frequency	0	40	230	230	130.0	39	132
Somewhat SS	Effectiveness	0	4	40	40	26.3	8.8	28
	Frequency	0	0	40	40	23.4	10	24
Relatively Ineffective SS	Effectiveness	0	2	60	60	31.1	13.3	30
	Frequency	0	1	60	60	29.7	13.7	29

Effectiveness: $F(2,76) = 589.74$, $p < .001$, observed power = 1.00, large effect size: $\eta_p^2 = .93$.

Frequency of use: $F(2,76) = 397.80$, $p < .001$), observed power = 1.00, large effect size: $\eta_p^2 = .91$.

Contact: kkozan@fsu.edu

Instructional Systems & Learning Technologies Program, Dept. of Educational Psychology & Learning Systems, College of Education, Health and Human Sciences