NSW Learning Analytics Working Group

Experiences with an Adaptive Learning Product

adaptive testing

confidence and proficiency

analytics

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Adaptive Learning

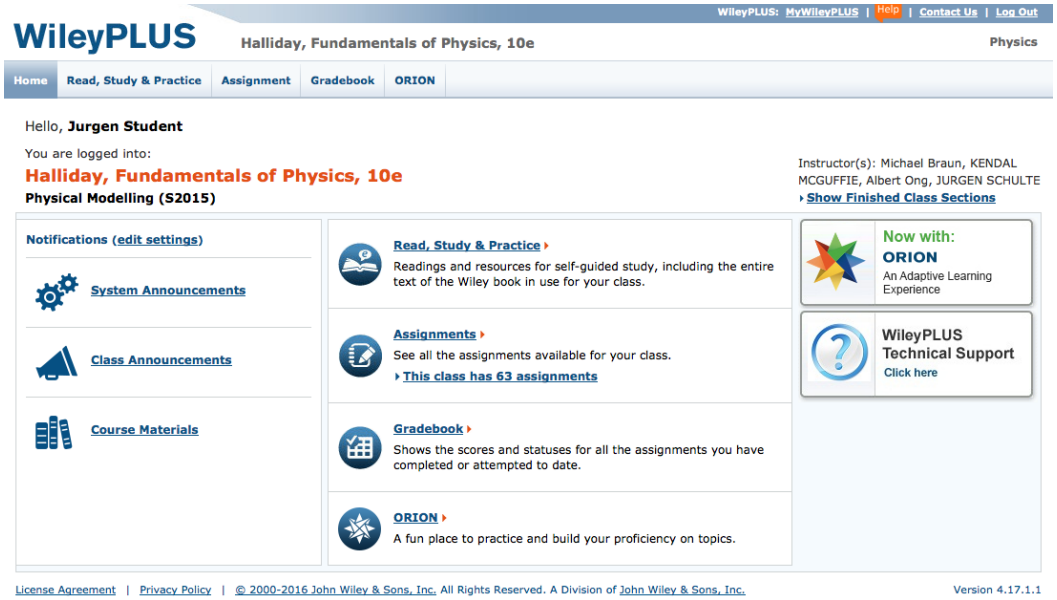
Computerise Adaptive Testing

Presentation of educational material

according to students' learning needs

AI	1970s	(SCHOLAR, adaptive & intelligent learning systems)
	1980s	(Intelligent Tutoring Systems)
	1990s	(Adaptive Learning Technology)
	2000s	(AutoTutor, passed Turing test)

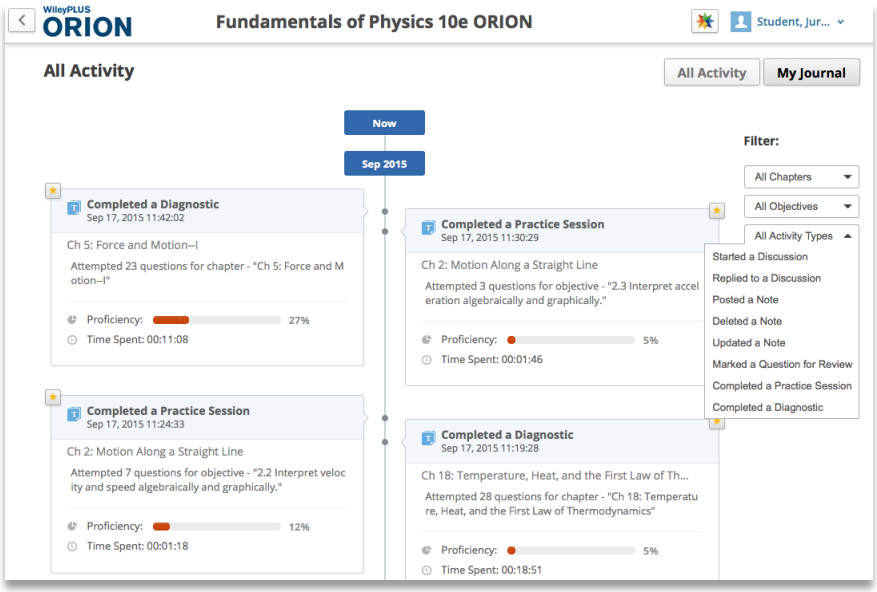
Adaptive Learning

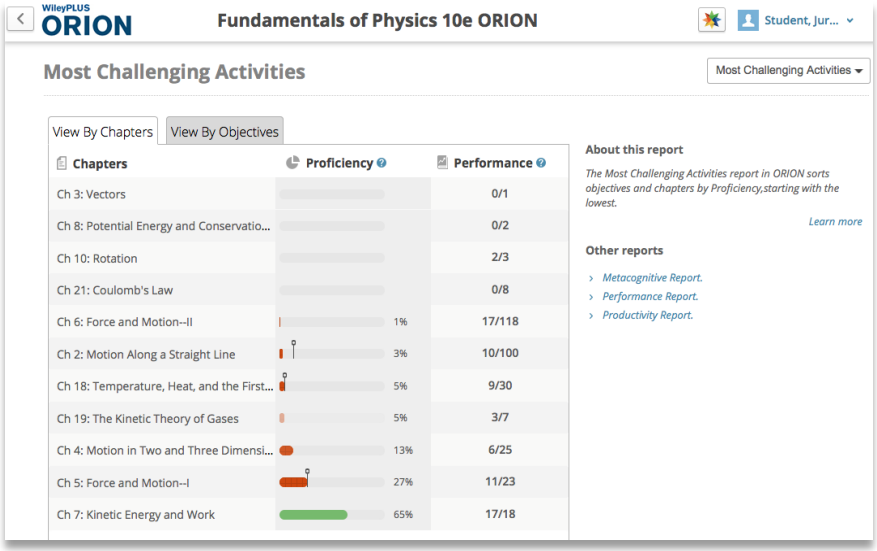


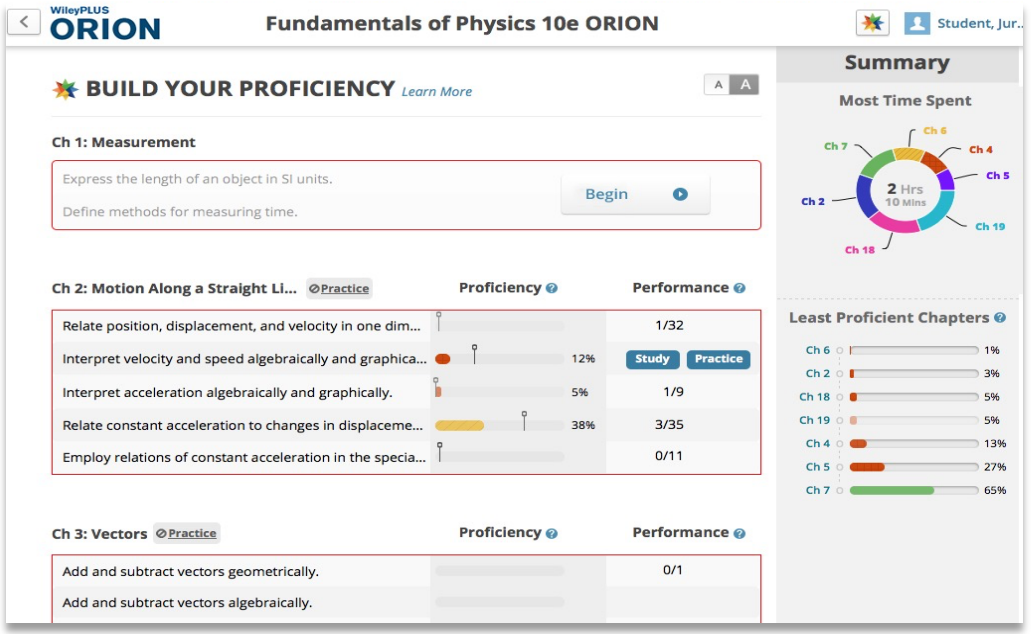
B Engineering Honours
BE DipEngPrac
BEngSci LLB
BE (Hons) BA Int St
BE (Hons) BMedSc
BE (Hons) BSci
BEng (Hons) DipProfEngPrac
BEng (Hons) DipProfEngPrac
BEng (Hons) BBus
BEng (Hons) BCIInn
Study Abroad Undergraduate

… various sub-majors

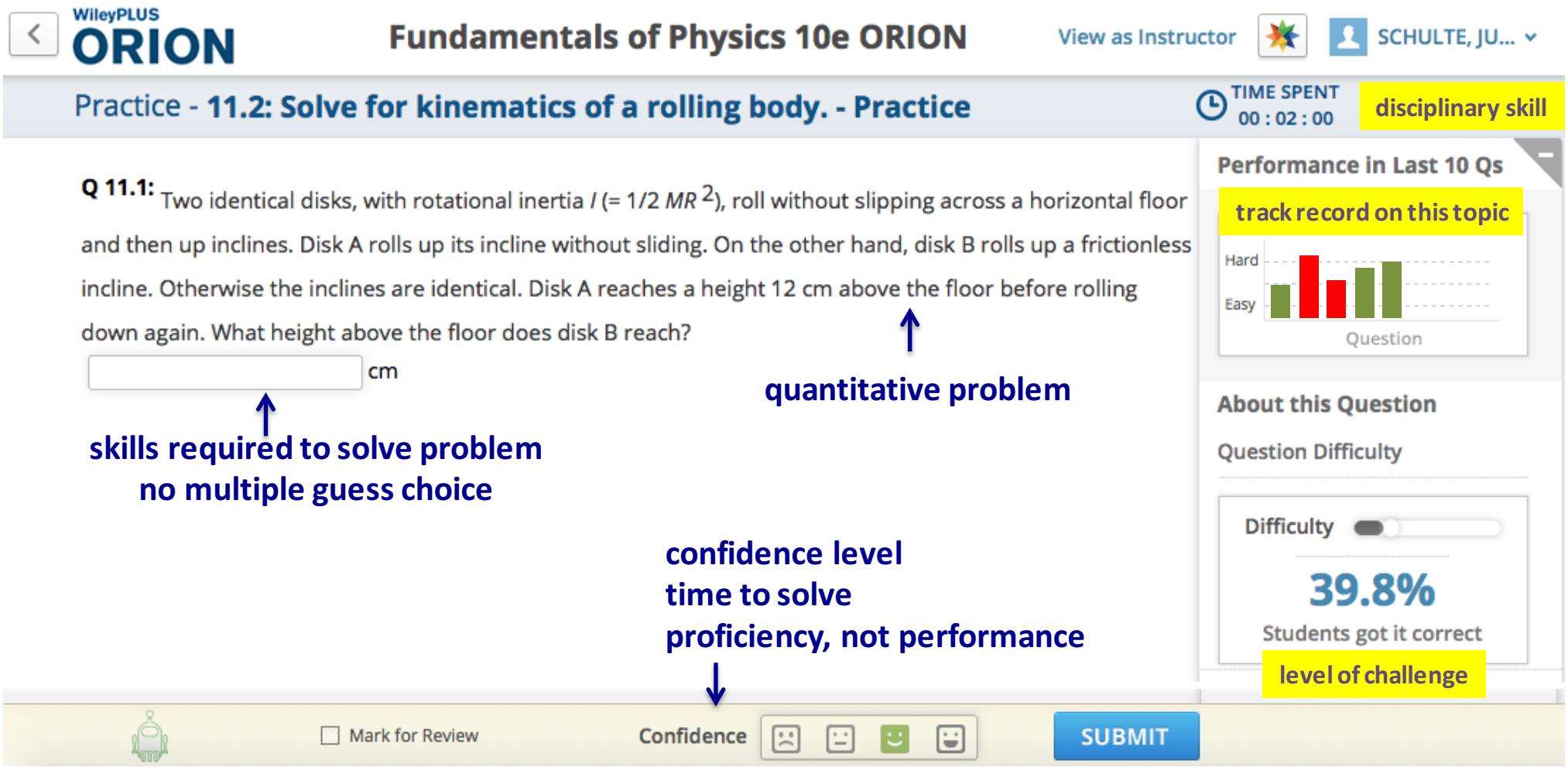
Adaptive Learning - Student's View





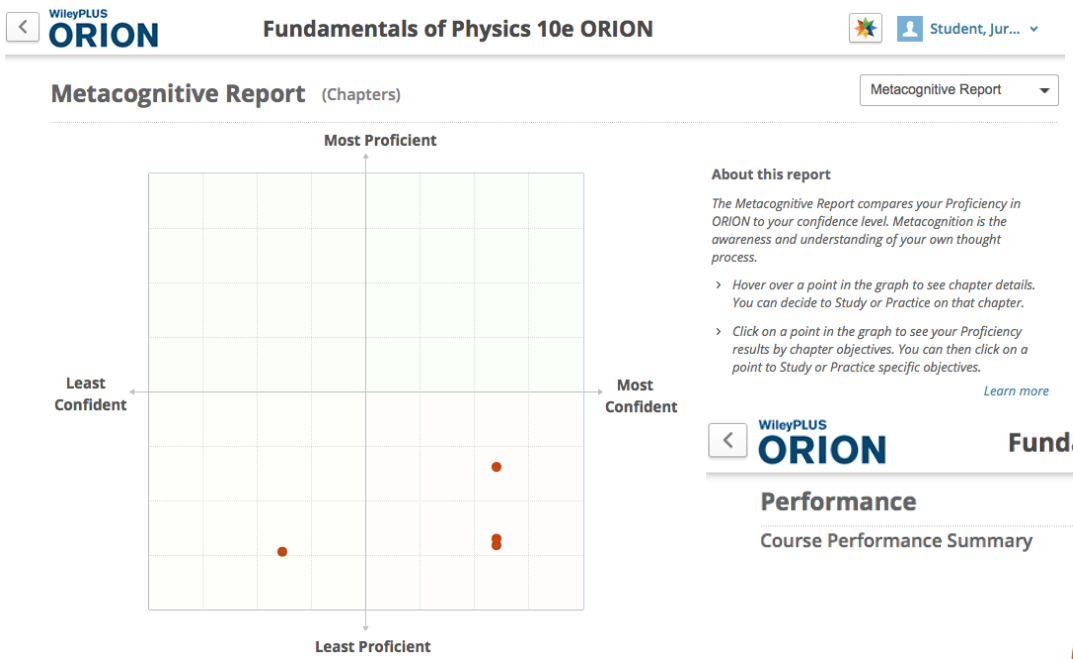


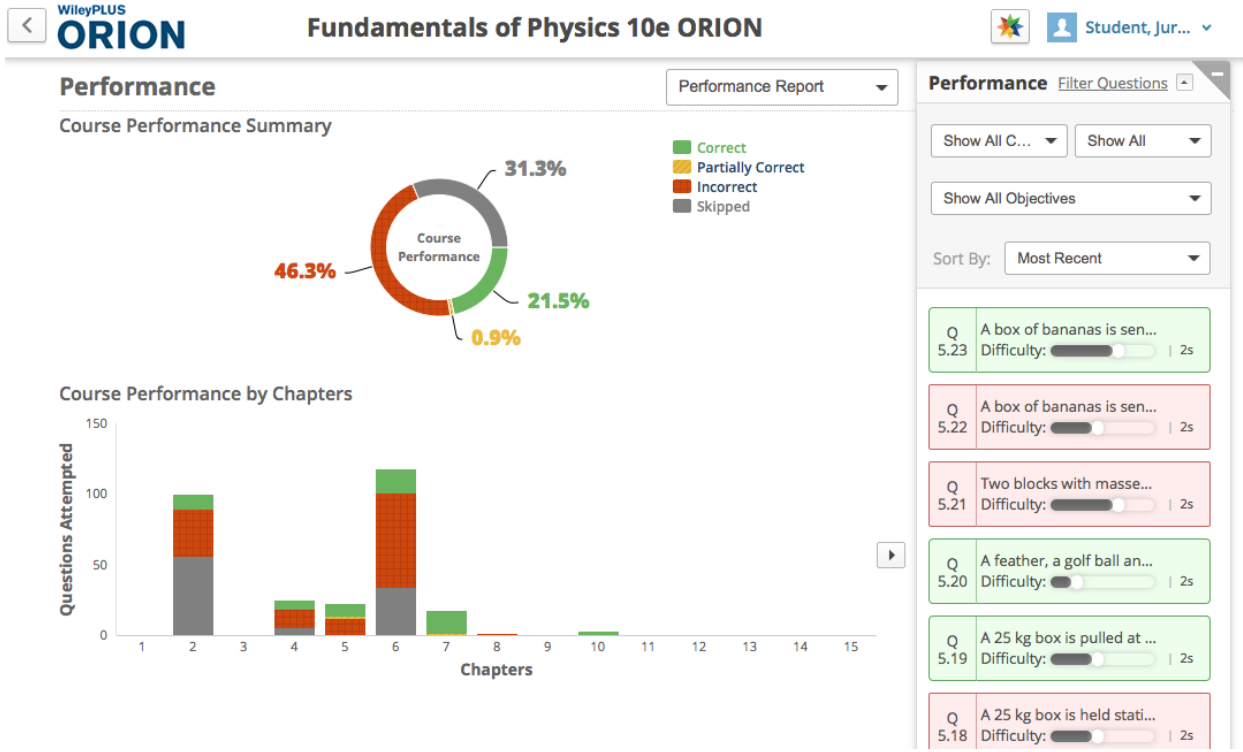
Adaptive Learning – Student's View



Next round of problems depends on how this round of 10 problems has been completed

Adaptive Learning - Student's View

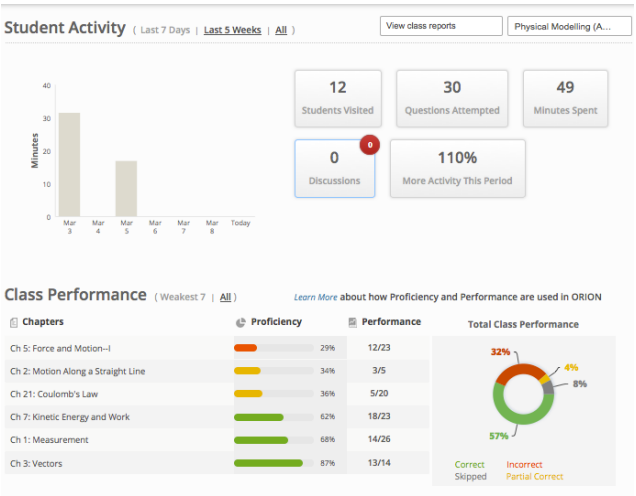




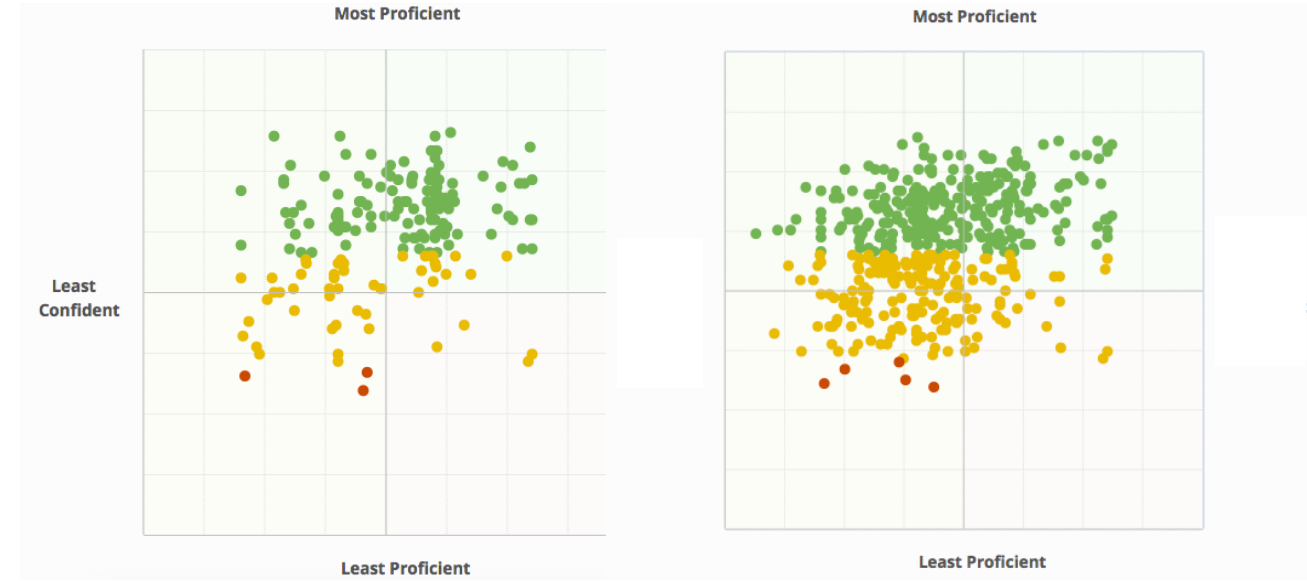
www.wileyplus.com

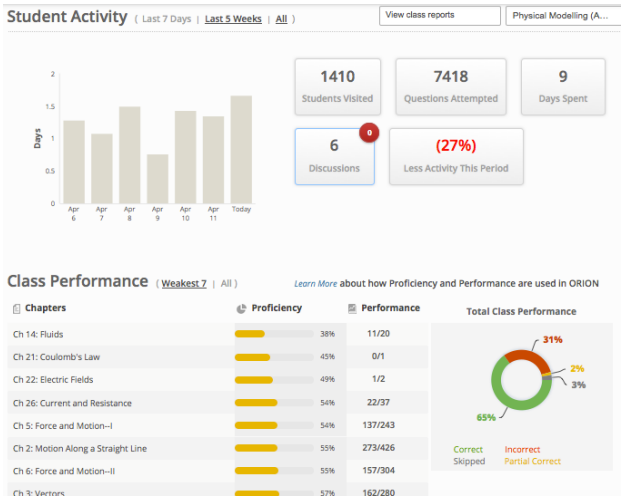
Adaptive Learning – Manager View

Week 3

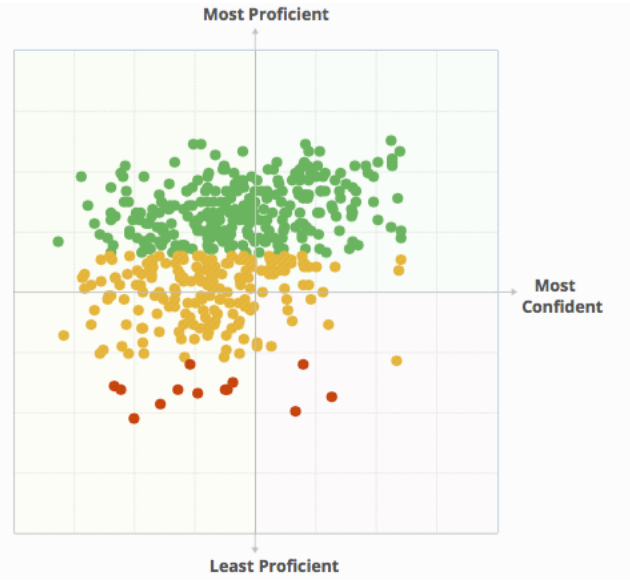


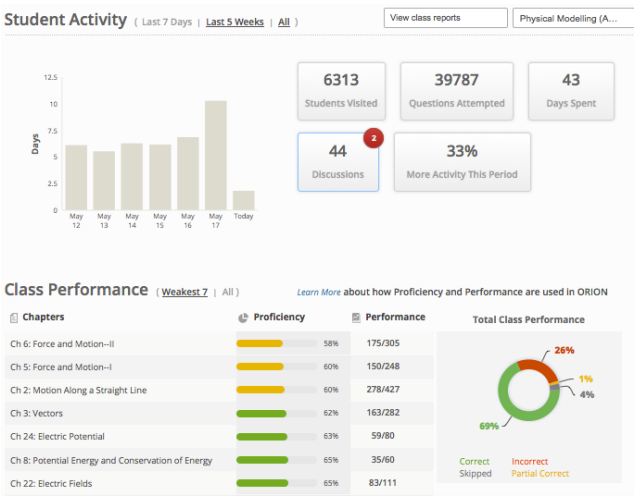
Week 8



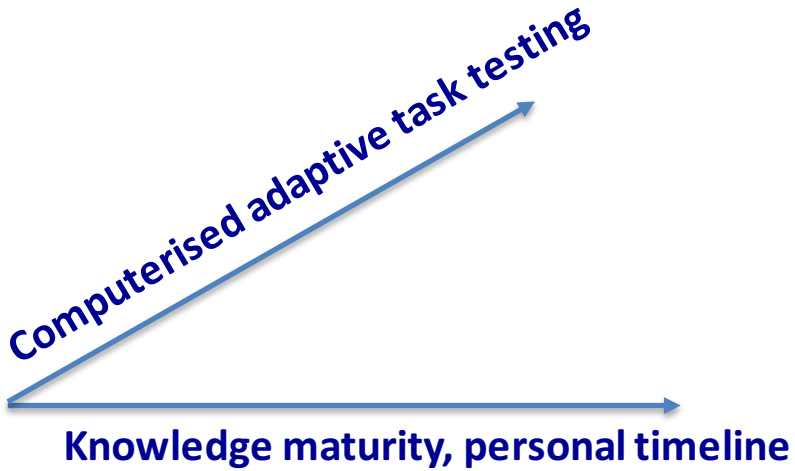


Week 12





Adaptive Learning 2D



d-analysis	motion	forces	statics	momentum	energy	thermal	electricity	fluids	waves	optics

Adaptive Learning

‘Adaptive Learning’ (2D)

Adaptive to …

- learning ability
- learning load
- personal circumstances
- personal interest
- building up skills

flexible low to high level entry

24/7 access, all semester long

continuous incremental work

start and work on preferred topics

continue any time where left off last

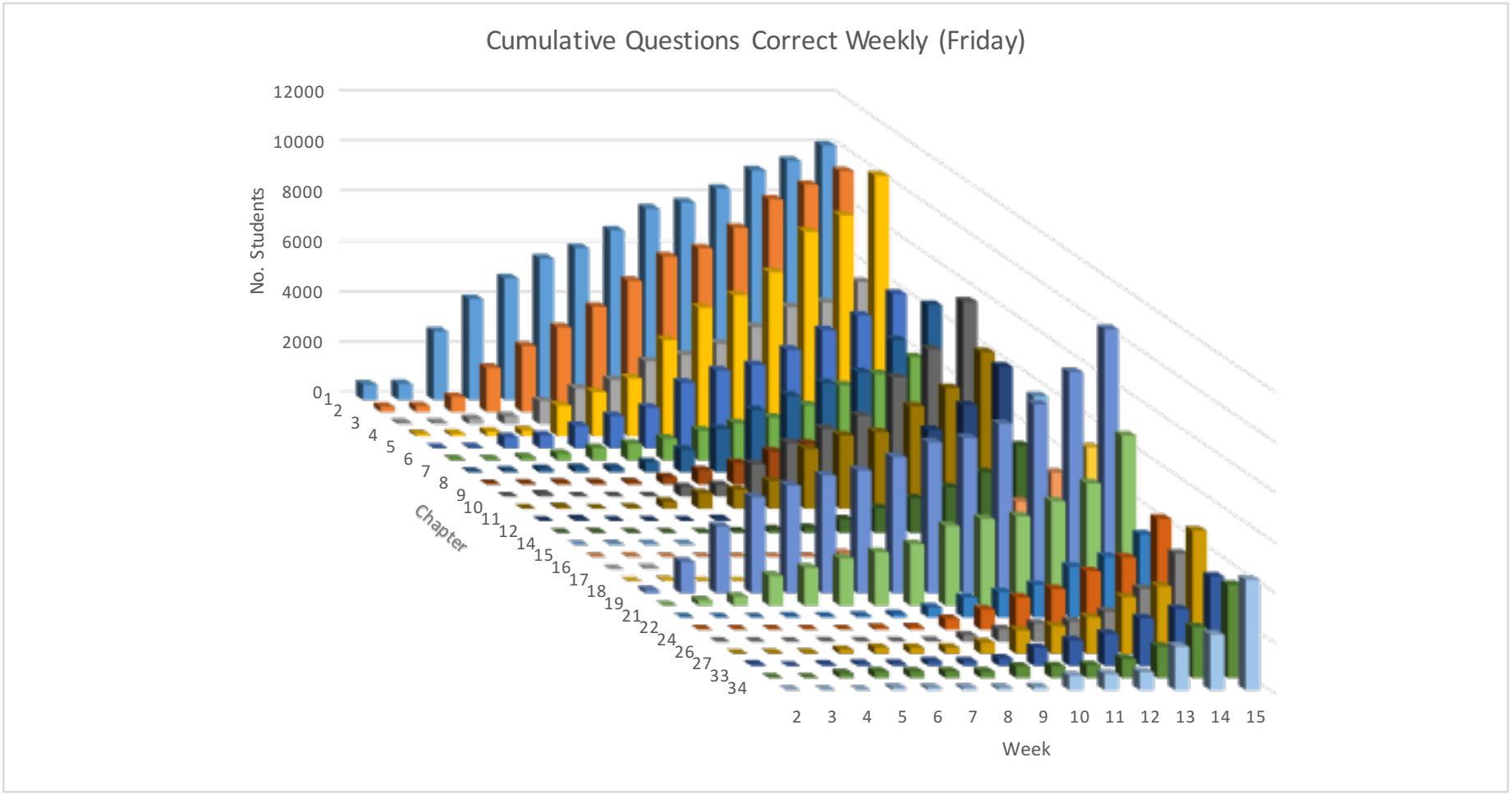
Adaptive Learning Analytics

Data extraction, preparation, analytics …

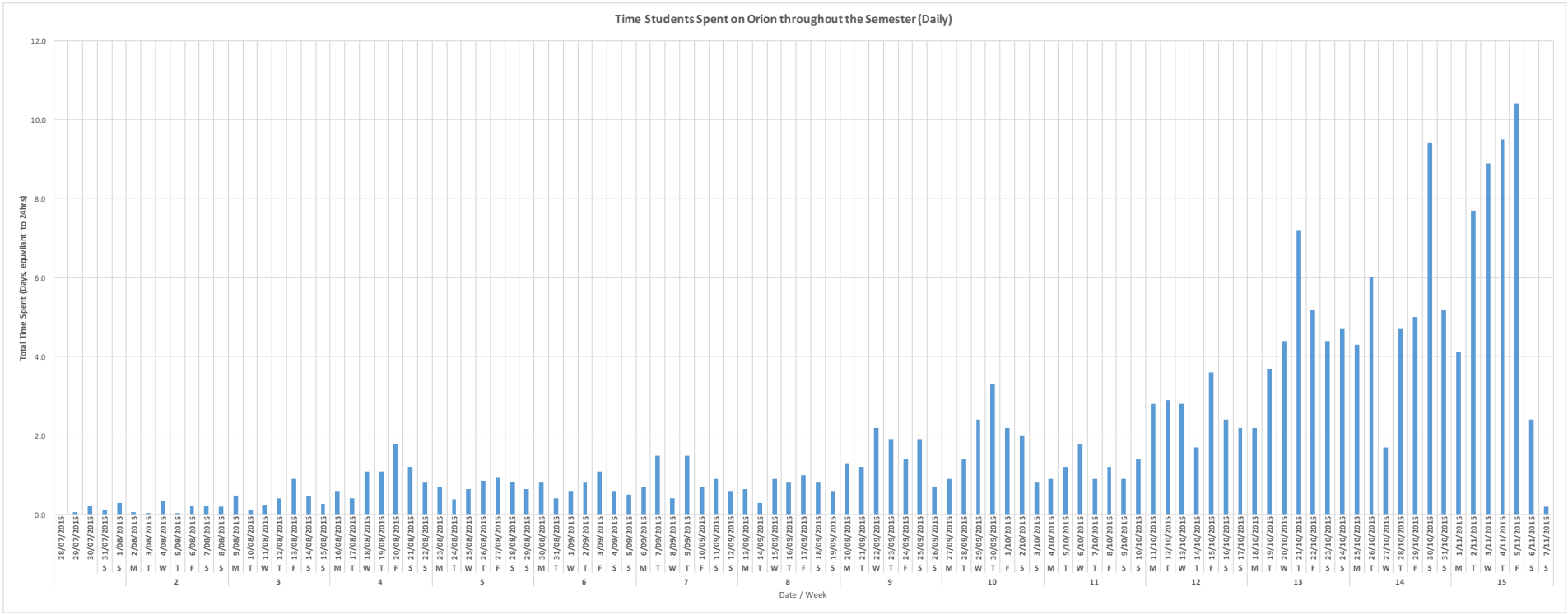
F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA	AB	AC	AD	AE	AF
Chapter 1	Chapter 1	Chapter 1	Chapter 2	Chapter 2	Chapter 2	Chapter 2	Chapter 3	Chapter 3	Chapter 3	Chapter 3	Chapter 4	Chapter 4	Chapter 4	Chapter 4	Chapter 5	Chapter 5	Chapter 5	Chapter 5	Chapter 6	Chapter 6	Chapter 6	Chapter 6	Chapter 7	Chapter 7	Chapter 7	Chapter 7
79%	(59/74)	1 hr 35 m	0%	90%	(13/14)	5 min 19	0%	75%	(38/57)	43 min 3	0%	73%	(31/43)	31 min 4	0%	86%	(12/14)	8 min 51	0%	99%	(13/13)	5 min 47	0%	91%	(11/11)	3 min 51
88%	(223/252	3 hr	0%	73%	(93/128)	2 hr 32 m	0%	82%	(30/43)	38 min 5	0%	65%	(125/148	2 hr 32 m	0%	98%	(35/41)	25 min 4	0%	97%	(37/45)	48 min 1	0%	87%	(41/47)	47 min 3
71%	(125/156	2 hr 2 mi	0%	82%	(58/75)	1 hr 1 mi	0%	84%	(42/57)	37 min 1	0%	61%	(59/77)	54 min 4	0%	49%	(50/63)	38 min 5	0%	76%	(32/42)	32 min 3	0%	80%	(34/40)	15 min 6
82%	(148/180	3 hr 33 m	25%	88%	(161/214	5 hr 22 m	0%	91%	(101/134	3 hr 57 m	78%	80%	(94/115)	2 hr 54 m	40%	86%	(47/69)	1 hr 34 m	0%	95%	(45/59)	1 hr 28 m	78%	81%	(40/41)	36 min 5
64%	(74/120)	2 hr 33 m	0%	64%	(48/74)	58 min 5	0%	70%	(23/30)	1 hr 7 mi	0%	64%	(21/30)	29 min 1	0%	62%	(17/22)	25 min 4	0%	95%	(15/15)	14 min 1	0%	89%	(26/33)	29 min 2
68%	(140/188	4 hr 48 m	0%	63%	(72/114)	4 hr 32 m	0%	74%	(31/43)	1 hr 37 m	0%	86%	(115/153	5 hr 5 mi	0%	94%	(77/89)	5 hr 8 mi	0%	92%	(38/46)	2 hr 42 m	0%	90%	(170/180	6 hr 12 m
77%	(76/115)	4 hr 25 m	0%	90%	(121/140	14 hr 44	0%	93%	(58/82)	17 hr 37	0%	80%	(102/126	5 hr 12 m	0%	77%	(87/109)	9 hr 37 m	0%	97%	(58/62)	15 hr 19	0%	75%	(94/105)	9 hr 34 m
76%	(17/20)	56 min 5	52%		(2/26)	12 min 3	0%		(2/4)	5 min 18	0%		(1/3)	1 min 21	0%		(3/10)	23 min 5	0%		(0/4)	9 min 17	70%	52%	(12/23)	20 min 4
19%	(12/20)	34 min 59 sec																								
60%	(109/165	4 hr 9 mi	0%	63%	(101/170	4 hr 54 m	0%	64%	(186/246	5 hr 55 m	0%	62%	(126/165	1 hr 54 m	0%	61%	(115/175	1 hr 58 m	0%	68%	(63/82)	41 min 8	0%	68%	(145/160	1 hr 53 m
80%	(286/335	15 hr 50	0%	92%	(43/50)	52 min 4	0%	85%	(166/212	4 hr 53 m	0%	85%	(196/235	5 hr 31 m	0%	87%	(69/91)	2 hr 8 mi	0%	97%	(51/66)	1 hr 39 m	0%	89%	(51/55)	58 min 3
51%	(13/20)	25 min 4	21%	30%	(14/23)	54 min 42 sec																				
	(7/20)	26 min 2	20%	39%	(11/21)	25 min 2	0%		(6/9)	9 min 26																
52%	(22/35)	45 min 4	0%	71%	(58/77)	2 hr 47 m	0%	96%	(10/10)	12 min 1	0%	86%	(52/61)	2 hr 51 m	0%	94%	(38/46)	1 hr 57 m	0%	87%	(8/10)	42 min 1	0%	81%	(41/46)	2 hr 51 m
76%	(86/118)	2 hr 2 mi	0%	87%	(88/113)	2 hr 52 m	0%	78%	(38/56)	1 hr 24 m	0%	80%	(83/101)	1 hr 54 m	0%	88%	(30/43)	51 min 7	0%	72%	(39/64)	2 hr 29 m	0%	76%	(64/89)	2 hr 47 m
45%	(13/20)	38 min 5	25%	30%	(17/41)	1 hr 37 m	0%	42%	(23/42)	2 hr 5 mi	38%	10%	(21/40)	1 hr 20 m	22%	37%	(21/40)	44 min 27 sec								
18%	(20/42)	56 min 4	0%	61%	(70/86)	5 hr 36 m	0%	98%	(38/48)	2 hr 49 m	0%	80%	(36/47)	2 hr 52 m	0%	95%	(35/42)	2 hr 34 m	0%	96%	(36/41)	2 hr 30 m	0%	81%	(57/60)	3 hr 49 m
74%	(40/54)	34 min 1	0%	72%	(59/81)	1 hr 3 mi	0%		(7/9)	8 min 39	0%	27%	(21/40)	26 min 5	0%	69%	(30/46)	29 min 4	0%	90%	(31/40)	25 min 5	0%	76%	(57/64)	41 min 6
84%	(238/278	10 hr 19	0%	96%	(37/40)	3 hr 31 m	0%	82%	(34/40)	3 hr 55 m	0%	87%	(44/48)	1 hr 52 m	0%	98%	(43/44)	2 hr 23 m	0%	84%	(50/60)	4 hr 6 mi	0%	70%	(72/75)	6 hr 16 m
72%	(104/112	4 hr 42 m	84%	93%	(46/47)	1 hr 20 m	0%	99%	(47/51)	2 hr 49 m	0%	87%	(43/74)	1 hr 54 m	86%	87%	(68/70)	3 hr 31 m	0%	87%	(33/46)	1 hr 11 m	3%	65%	(78/98)	2 hr 33 m
73%	(61/83)	2 hr 8 mi	0%	93%	(71/100)	1 hr 33 m	0%	100%	(40/66)	1 hr 37 m	0%	91%	(141/238	3 hr 13 m	0%	99%	(42/86)	2 hr 13 m	0%	96%	(40/55)	1 hr 4 mi	0%	84%	(57/67)	1 hr 57 m
64%	(82/110)	1 hr 50 m	0%	74%	(80/117)	1 hr 19 m	0%	4%	(11/27)	12 min 5	0%	14%	(36/64)	1 hr 12 m	0%	56%	(58/92)	1 hr 24 m	0%	92%	(31/38)	38 min 4	0%	75%	(122/141	1 hr 16 m
81%	(320/418	4 hr 13 m	0%	80%	(385/451	4 hr 49 m	0%	85%	(114/151	1 hr 3 mi	0%	82%	(180/221	1 hr 8 mi	0%	86%	(72/95)	47 min 9	0%	85%	(48/52)	46 min 5	0%	87%	(117/134	1 hr 2 mi
55%	(172/224	4 hr 52 m	0%	80%	(206/329	2 hr 3 mi	0%	83%	(45/69)	50 min 5	0%	78%	(80/115)	1 hr 22 m	0%	94%	(44/59)	41 min 5	0%	99%	(44/57)	1 hr 39 m	0%	83%	(35/44)	26 min 5
82%	(81/108)	2 hr 7 mi	0%	92%	(137/177	3 hr 41 m	0%	99%	(57/75)	2 hr 14 m	0%	87%	(184/222	4 hr 14 m	0%	91%	(68/87)	1 hr 41 m	0%	94%	(38/46)	1 hr 19 m	0%	84%	(183/192	9 hr 13 m
81%	(32/37)	1 hr 23 m	0%	80%	(62/76)	4 hr 10 m	0%	79%	(43/58)	3 hr 45 m	0%	83%	(128/142	7 hr 20 m	0%	75%	(107/121	9 hr 14 m	0%	93%	(38/40)	2 hr 11 m	0%	73%	(147/152	7 hr 49 m
75%	(18/23)	30 min	0%	84%	(40/52)	1 hr 6 mi	0%	80%	(39/60)	1 hr 18 m	0%	71%	(106/129	2 hr 7 mi	0%	70%	(54/87)	1 hr 27 m	0%	92%	(35/41)	40 min 3	0%	77%	(37/40)	35 min 2
76%	(18/21)	37 min 5	0%	28%	(23/49)	1 hr 38 m	0%		(3/7)	31 min 3					0%	54%	(16/29)	50 min 2					0%	0%	(0/1)	1 min 34
	(8/31)	11 min 5					0%	11%	(2/5)	2 min 10																

… feed into weekly Personal Support Actions

Adaptive Learning Analytics



Adaptive Learning Analytics



Analytics triggered PSA

- Weekly personalised emails
  - Status report
  - Expectations
  - Encouragement / Caution
  - Progress support
  - Early warning flags

ORION

Pros

- informative dash boards
- links with WileyPLUS gradebook
- proficiency, confidence, diagnostic
- extends WileyPLUS problem set
- local technical support
- free of charge add-on

Cons

- separate development team
- long time for support to response
- limited access to visible data
- data format non-standard
- external product
- more a trial than a solid product

Adaptive Learning

What did you value most about the assessment structure in this subject (50% Orion, 30% prac, 20% exam)?

"Worked well for me. Engaging."

"I think Orion is a fantastic tool but I would have used it more if the punishment for answering incorrectly was not so bad."

"I liked that I could start where I had left off."

"Made it easier to let me do it at my own pace. Since it was online I could do more of it from home."

"Get marked on questions you do at home [opposed] to other subjects [where] you get marked mostly on test and assignments."

"If something was due in another subject I could focus on that then come back to Orion knowing it's not due yet."

"It worked very well for me because I tend to stress when a final exam has a huge percentage weight."

Adaptive Learning

In your own opinion and from experience you may have had in other subjects, do you believe you had deeper learning experience this way [adaptive] compared to an exam-based assessment ?

Other subject you won't do many questions for each chapter but for this subject I was able to do many questions on all chapters which gave me a good depth of knowledge.

It was different because I was able to see improvements on a weekly basis. I didn't do physics at school. So this assessment task really helped me because I was able to do heaps of questions and track my progress.

Also, having a big focus on [problem solving] practise skills is much more valuable for overall learning.

I found I was much more involved with this style of assessment.

Were there any other skills you developed throughout the process of this homework assessment task?

Time management
Solve problems quicker
Confidence when problem solving
Visualise and solve problems quicker

Individualised just-in-time feedback

"I liked that Dr Jurgen was able to send weekly progress reports to not only give us the proficiency scores but where we are sitting in the subject in order to get a pass. It was a source of motivation !!"


Q & A