



#LTSE2023

Experiential Learning in finance: Integrating a digital options trading platform into undergraduate teaching and learning

Ian Whitfield
&
Michael Lucey

Our Problem!



Example MEQ Quotes:

“need more real-world examples of options”

“need more exposure to practical experience like it would be in the workplace”

“I still haven't gotten a strong hold on Options and Derivatives I still cannot relate how I am supposed to apply this to daily life”

Issues for level 2 and level 3 students:

- Complexity
- Arcane language
- Real world application is not intuitive



Why are Derivatives Difficult?



- A financial asset that derives its value from an underlying asset
- Options give the holder (long position) the right but not the obligation to buy (call) or sell (put) the underlying asset from the writer (short position) at a fixed price at a fixed future date (European-style) or up to and including a fixed future date (American-style)
- These are the simplest types of contract and are therefore known as 'plain vanilla'
- Provide a base for more complex contracts
- **Students are not really asking for real world examples!**

Black-Scholes (1973) model

$$c = S_0 N(d_1) - Ke^{-rT} N(d_2)$$

$$d_{1,2} = \frac{\ln(S_0 / K) + \left(r \pm \frac{1}{2} \sigma^2\right) T}{\sigma \sqrt{T}}$$

$$N(x) = \frac{1}{\sigma \sqrt{2\pi}} \int_{-\infty}^x -e^{-1/2 s^2} ds$$

$$p = Ke^{-rT} N(-d_2) - S_0 N(-d_1)$$



What Have We Tried?

Cboe

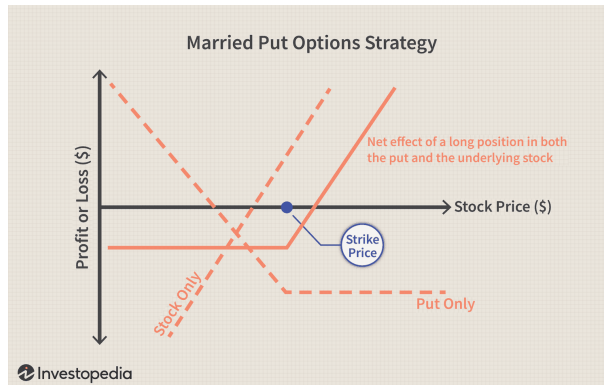
Apple Inc. (aapl)

2023-05-04 15:59:59 ET Bid: 169.33 Ask: 169.46 Vol: 81,235,427 Last: 169.41

Options Chain

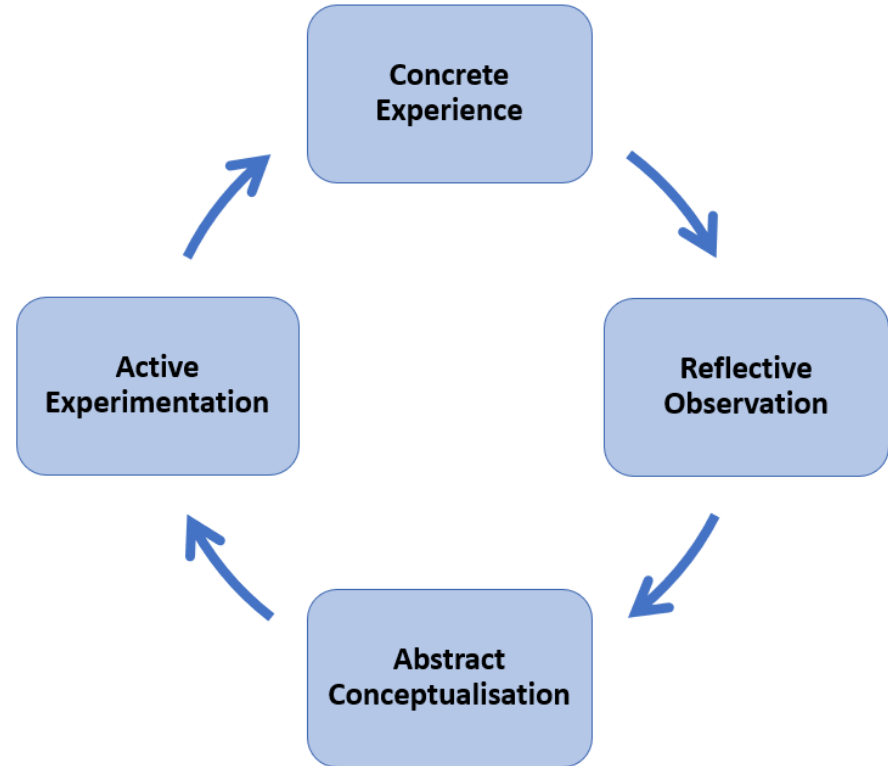
Calls

Last	Net	Bid	Ask	Vol	IV	Delta	Gamma	Int	Strike
6.7	-1.3	6.55	6.95	296	0.36	0.6201	0.0312	693	AAPL 162.500
5.15	-1.125	5.1	5.3	10,073	0.36	0.54	0.0333	32946	AAPL 165.000
3.9	-0.875	3.9	3.95	6,128	0.35	0.4552	0.0341	10611	AAPL 167.500
2.78	-0.745	2.8	2.85	13,165	0.34	0.37	0.0332	41570	AAPL 170.000
1.97	-0.485	1.91	1.99	2,797	0.33	0.2892	0.0306	10675	AAPL 172.500
1.32	-0.345	1.32	1.34	16,224	0.33	0.2172	0.0267	47878	AAPL 175.000



- Exchange quotes
- Strategy examples
- Spreadsheet workshops (experiential?)
- TV documentaries – BBC Horizon – The Midas Formula

The Experiential Learning Cycle



Reference

Kolb, D. A. (1984), *Experiential learning: Experience as the source of learning and development*. Englewood Cliffs, N.J: Prentice-Hall.

Our Partner Organisation



- [Zishi](#) is a global financial training, learning and performance technology company.
- Facilitates external engagement.
- Provides opportunity for experiential learning using derivatives trading simulator – Volcube.

Features of Volcube

- Options Trading Platform
 - Trading simulations
 - Trading competition
- Blitz Videos
- Tutorials
- Trading Strategies

volcube
Powered by ZISHI

Game History Learning **Account**

ACCOUNT DETAILS

Welcome Ian Whitfield

Group: Durham Masters 23
License Type: University
Expiry: Perpetual
Certification: N/A

DL Group Scores
My Settings
Change Password
Choose Language

DURHAM MASTERS 23: TRADING LEAGUE TABLE

Trading | Minigames | Assignments | Directional Games

Name	Player TPI	Level	HIGH TPI	Games	PAM	Speed	PCM	Quote Size
Matt	159	9	300	108/124	84	Price Accuracy Metric		
Alex	132	6	286	78/83	71	11.6	70	315
Yuwei	132	2	185	30/79	61	22.6	86	188
Deshuai	130	1	258	61/81	77	16.2	63	158
Angus	114	1	194	33/38	69	28.8	68	278
Tom	102	1	225	5/6	78	18	86	109
Tianyi	99	2	186	42/44	62	16.6	80	407

TRADING PERFORMANCE

Player Name: IW
Player TPI: N/A
Level: 1

1
0
-1
NaN

Support | Terms of Access and Privacy Policy © 2010 - 2023 Volcube Ltd. All Rights Reserved.

How We Support Learning



- In-class use of videos to enhance learning
- Demonstrate ‘real world’ examples
- Recommended independent research
 - Glossary for unfamiliar terms
 - Basic and advanced tutorials
 - Trading games
 - Testing

Volcube Usage 2020/21

- 315 students signed up
- 226 signed in and used platform
- 5 students per year successfully progressed to second stage of interview process
- Successful students then progress to a trading floor (data not currently available)
- BUT!
 - Notable drop in engagement in 2021/22
 - But 1 invited to interview with OSTC



Survey Results (Likert Scale)



Practical Learning

Question - I learn best through actively engaging in practical tasks

Strongly Agree – 16

Somewhat Agree – 20

This is 75% of respondents

Survey Results

Volcube Experience at Level 2

Question	Positive	Neutral	Negative
Videos and tutorials helped me understand complex concepts and applications	87%	6.5%	6.5%
Trading Games helped me understand how options are used in the real world	87%	0%	13%
My Volcube experience helped me in my exam	73%	20%	7%
Volcube allowed me to experience working in a realistic environment	87%	0%	13%
Volcube allowed me to practice analysing and using information more effectively	87%	6.5%	6.5%
Volcube helped me to develop my problem-solving skills	80%	7%	13%
Using Volcube helped me improve my digital/IT skills	73%	7%	20%

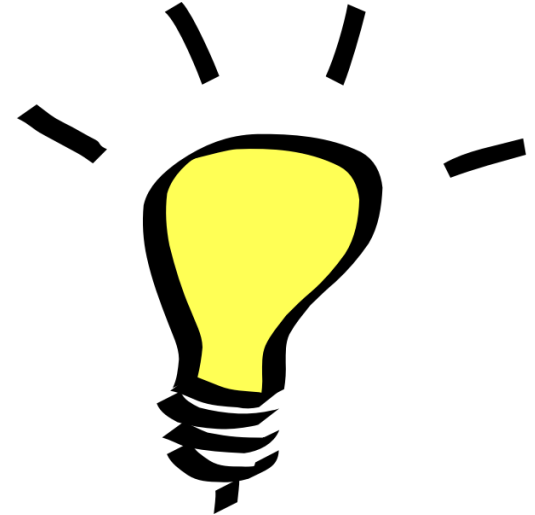
Qualitative Comments



- Time and other commitments were given as the main reasons for not participating
- A follow-up survey indicated that a lack of formal assessment was a further reason

What did we learn?

- Drop in engagement between level 2 and level 3 – why?
- The end of the academic year may not be the best time to survey students!
- Unless it 'counts' engagement will be patchy at best
 - Provide additional support and clearer guidance
 - Embed the trading simulation into summative assessment
 - Time the submission to avoid conflicts



Benefits



- Experiential learning/practical application
- Student satisfaction
- Diversity of assessment
- Volcube use
- Increase interest and engagement
- External engagement
- Key skills

Assessment - Overview

The assignment involves experiential learning using the Volcube trading platform that is provided to Durham by an external organisation, Zishi. A representative from Zishi will provide you with instructions on how to access and use the platform in the third lecture of Michaelmas term.

1. Register for a Volcube account and access the platform. **(5 marks)**
2. Complete 5 themes of option mini games (intrinsic/extrinsic, put-call parity, delta effect, delta hedging and vega/vol/value). You have unlimited attempts. You must answer a minimum of 25 questions in each mini game to achieve a score. **(15 marks)**
3. Complete 5 levels of hedge finder in directional games. You have unlimited attempts. **(15 marks)**
4. Complete 5 simulations in the 'Scenarios and Assignments' section as a single player. Each round has an escalating level of difficulty. You have only one attempt to complete each section. **(25 marks)**
5. Write a reflective account of your learning experience from using the Volcube platform. This component has a limit of 1,000 words.(40 marks)For parts 2, 3 and 4 you should take screen shots to demonstrate that you have completed the tasks. This should be merged with the reflective account in part 5 to produce a single document. The screenshots are not included in the word limit. **(40 marks)**

Assessment - Outcomes

1. 100% engagement
2. Exceptionally high marks (too high?) – bunching
 - Mean 81.51
 - Median 82
 - Standard deviation 5.60
3. Reflective accounts demonstrate experiential learning
4. Word cloud evidence that key objectives have been met
 - Firm grasp of complex concepts and terminology
 - Significant improvement of knowledge and understanding of practical application



completed number making positive still higher parity complete underlying extrinsic completing therefore derivatives understand better strategy basic reflective strategies however simulation broker mistakes future found experience practice theory quote process different volcube hedging intrinsic calculate given trades delta games learning scenarios final score result financial delta trading knowledge learn risks changes second short platform value volatility implied finder difficult exposure question hedge market using profit money learnt right actual section trade understanding change improve effect portfolio concepts questions skills change think answer trader order position theoretical directional learned spread started quantity provided simulations accuracy helped three calls performance futures

Key Messages

- Experiential learning with external engagement works!
 - Engagement
 - Learning
 - Practical application
 - Skills development



Refine assignment to better differentiate performance

- Remove mark for sign-up
- Reflective component for each task
- Any other suggestions?

- We would appreciate any comments and are happy to answer any questions

