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Learning Trends: Transaction Analysis

To better understand and measure how students learn accounting, Quantum records and analyzes individual student work and errors during student practice/tutoring sessions and compiles class data into an assessment summary report for instructor analysis and student intervention.

Objective

- Evaluate the learning impact of the Quantum Tutors for the topic of Transaction Analysis in a real-world setting by analyzing a statistical sample of students that have used Quantum's tutoring software during one semester.
- Over 530 students were evaluated. Students were enrolled in principles or financial accounting courses at both two- and four-year colleges from August through September 2010 and completed a minimum of 18 transactions within the software.

Key Findings

- **Students improved 15% when practicing the accounting equation**, improving their initial accuracy for completing transactions from 63% to 78% (see page 2). This is where critical learning takes place to be successful in understanding the topics of transaction analysis and adjusting entries.
- For the accounting equation (see page 2), **44% of students achieved a high level of mastery** (mastered 80% or more of the transaction types attempted) and **44% were rated as medium proficiency** (mastered 40% or more of the transaction types attempted). The remaining 12% of students were rated as low mastery and require additional practice and study time.
- There were **3,391 questions asked by students** when seeking help from the software with an average of six questions per student (see page 4). Questions were wide ranging and diverse in scope.

- On average, **students spent two hours working problems and completed 51.7 transactions.**
- For the accounting equation, the three most common errors (see page 2) were:
 - 1) Reporting an increase for an account when there should have been a decrease or vice versa (31.5%).
 - 2) Included an account that is not involved in the transaction (29.5%).
 - 3) Put an account in the wrong category for the accounting equation (Assets = Liabilities + Equity) (25.4%).
- For the accounting equation, students mastered an average of eight transaction types (see page 3). Transaction types that students had the lowest success rates analyzing included:
 - Incurred expenses on account
 - Loaned cash
 - Paid cash for expenses
 - Received payment in advance of services
 - Prepaid expenses
 - Received payment on account
 - Owner withdrawals

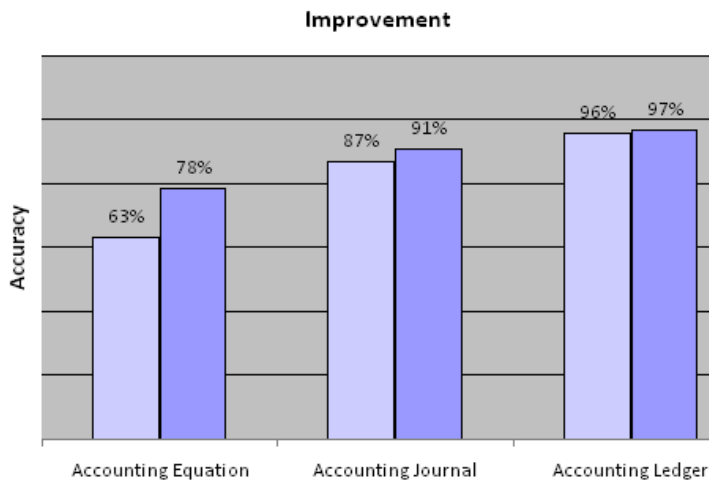
Conclusions

When examining the usage and assessment trends of students who used the Quantum Tutors this semester, **students improved 15% in their ability to analyze transactions.** More importantly, **88% of students achieved a high to medium level of mastery with an average study time of two hours.** In addition, there is a direct correlation between number of transactions completed and level of mastery achieved. The more practice with various transactions types, the higher the mastery.

“When examining the usage trends of students that used the Quantum Tutors this semester, students improved 15% in their ability to analyze transactions. More importantly, 88% of students achieved a high to medium level of mastery for Transaction Analysis with an average study time of only two hours.”

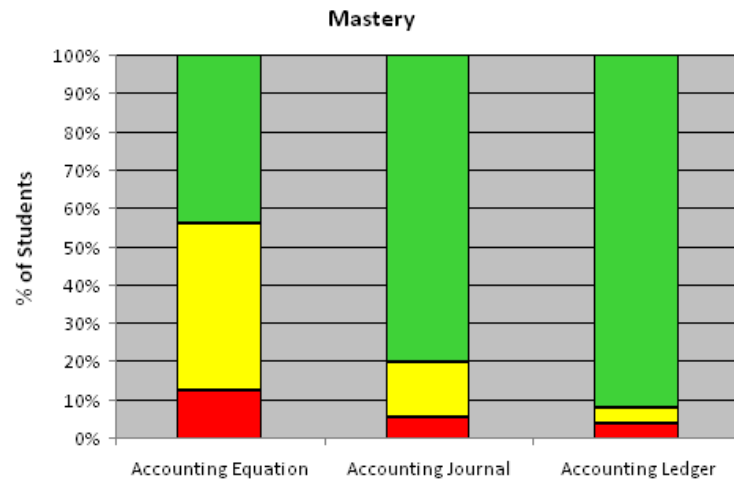
— **Benny G. Johnson, Ph.D.**
President and CEO
Quantum Simulations, Inc.

Overall Student Improvement and Mastery



	Accounting Equation	Accounting Journal	Accounting Ledger
Initial Accuracy	63%	87%	96%
Final Accuracy	78%	91%	97%
Improvement	15%	4%	1%

Students improved 15% when practicing the accounting equation. This is where most of the critical learning takes place and why success is high for the accounting ledger and journal.



	Accounting Equation	Accounting Journal	Accounting Ledger
High	44%	80%	92%
Medium	44%	14%	4%
Low	12%	5%	4%

For the accounting equation, 44% of students achieved a high level of mastery, 44% were rated as medium, and the remaining 12% of students were rated as low mastery and require additional practice and study time.

Errors by Concept

Accounting Equation			
Error Description	Students Making This Error	Overall Frequency	% of All Errors
Reported an increase for an account when there should have been a decrease or vice versa	495	3477	31.5%
Included an account that is not involved in the transaction	484	3262	29.5%
Put an account in the wrong A/L/E category	460	2805	25.4%
Reported the incorrect amount for an account	254	730	6.6%
Put an account in the accounting equation more than once for a transaction	150	352	3.2%
Tried recording the effect of a non-transaction	83	313	2.8%
Did not enter a numerical value for the amount	74	114	1.0%

Accounting Journal			
Error Description	Students Making This Error	Overall Frequency	% of All Errors
Put debit or credit amounts in the wrong journal column	278	805	34.2%
Included an account in the journal that is not involved in the transaction	256	559	23.8%
Did not put debits first for a journal entry	240	439	18.7%
Entered the wrong debit or credit amount in the journal	148	253	10.8%
Put negative amounts for debits and credits in the journal	85	129	5.5%
Put an account in a journal/ledger entry more than once for a transaction	46	52	2.2%
Entered both a debit and credit amount for a single account	26	44	1.9%
Did not enter a numerical value for the debit or credit amount in a journal entry	38	41	1.7%
Did not enter a debit or credit amount	29	30	1.3%

Accounting Ledger			
Error Description	Students Making This Error	Overall Frequency	% of All Errors
Put debit or credit amounts in the wrong ledger column	184	590	67.8%
Entered the wrong debit or credit amount in the ledger	101	193	22.2%
Put negative amounts for debits and credits in the ledger	17	31	3.6%
Did not enter a numerical value for the debit or credit amount in a ledger entry	24	31	3.6%
Entered both a debit and credit amount for a single account	14	25	2.9%

Errors by Transaction

Accounting Equation					
Transaction	Completed	Failed to Reach Solution	Requested Solution	Solved with Help	Solved with No Errors
Paid cash for expenses	3257	4.6%	6.2%	26.7%	62.5%
Borrowed cash	2187	0.8%	5.8%	12.1%	81.3%
Stockholder investment	1844	0.2%	5.1%	6.8%	87.9%
Prepaid expense	1694	7.3%	7.5%	19.6%	65.6%
Owner investment	1688	1.3%	7.5%	6.6%	84.7%
Received payment in advance of services	1560	4.6%	8.6%	23.9%	62.9%
Performed services on account	1442	3.8%	8.1%	18.3%	69.8%
Received payment for services	1398	1.5%	4.1%	10.7%	83.6%
Paid on accounts payable	1371	1.8%	8.0%	18.5%	71.8%
Purchased supplies on account	1309	0.7%	3.4%	9.0%	86.9%
Received payment on account	1115	5.7%	9.1%	18.6%	66.7%
Paid cash for equipment	1079	2.2%	3.9%	12.2%	81.6%
Purchased a building with cash and a note	1009	3.7%	6.3%	17.2%	72.7%
Not a transaction	995	1.4%	10.9%	5.9%	81.8%
Incurred expenses on account	970	9.9%	10.6%	33.2%	46.3%
Purchased equipment with cash and a note	789	1.5%	4.2%	15.2%	79.1%
Owner withdrawals	716	3.2%	6.1%	23.3%	67.3%
Paid dividends	703	1.4%	5.8%	18.3%	74.4%
Paid cash for supplies	542	1.3%	2.6%	7.0%	89.1%
Purchased equipment on account	377	0.8%	2.9%	11.9%	84.4%
Purchased furniture on credit	279	1.4%	3.6%	10.4%	84.6%
Purchased inventory on account	256	0.0%	3.5%	8.6%	87.9%
Purchased equipment with a note	224	0.4%	2.2%	8.0%	89.3%
Loaned cash	209	10.5%	8.1%	29.2%	52.2%
Purchased land with a note	173	0.0%	1.2%	2.9%	96.0%
Sold equipment	130	2.3%	5.4%	20.0%	72.3%
Total	27316	3.0%	6.4%	16.2%	74.4%

Accounting Journal					
Transaction	Completed	Failed to Reach Solution	Requested Solution	Solved with Help	Solved with No Errors
Paid cash for expenses	2975	0.5%	1.9%	7.3%	90.3%
Borrowed cash	2007	0.3%	2.4%	5.8%	91.4%
Stockholder investment	1734	0.3%	2.9%	4.2%	92.6%
Owner investment	1500	0.4%	3.3%	3.5%	92.8%
Prepaid expense	1495	0.6%	2.1%	6.0%	91.3%
Received payment in advance of services	1342	0.2%	1.9%	3.1%	94.7%
Performed services on account	1280	0.5%	2.0%	7.1%	90.5%
Received payment for services	1250	0.2%	1.3%	3.4%	95.1%
Purchased supplies on account	1219	0.2%	2.3%	4.8%	92.7%
Paid on accounts payable	1210	0.7%	2.7%	7.5%	89.0%
Paid cash for equipment	1021	0.3%	2.1%	5.5%	92.2%
Received payment on account	958	0.2%	1.0%	4.1%	94.7%
Purchased a building with cash and a note	913	1.5%	3.1%	12.8%	82.6%
Incurred expenses on account	865	1.5%	2.8%	20.8%	74.9%
Purchased equipment with cash and a note	734	0.3%	1.6%	9.0%	89.1%
Paid dividends	661	0.6%	2.6%	6.7%	90.2%
Owner withdrawals	632	0.3%	1.7%	7.4%	90.5%
Paid cash for supplies	508	0.4%	0.6%	4.1%	94.9%
Purchased equipment on account	351	1.1%	1.1%	6.8%	90.9%
Purchased inventory on account	245	0.4%	2.4%	6.1%	91.0%
Purchased furniture on credit	244	0.0%	1.2%	4.5%	94.3%
Purchased equipment with a note	218	0.0%	0.5%	6.9%	92.7%
Loaned cash	199	0.5%	1.0%	15.6%	82.9%
Purchased land with a note	166	0.0%	1.8%	3.6%	94.6%
Sold equipment	119	0.0%	4.2%	0.8%	95.0%
Total	23846	0.5%	2.2%	6.5%	90.9%

Commonly Asked Student Questions

Question	Frequency	% of All Questions
Will this transaction cause liabilities or equity to change?	462	13.6%
How will this affect the business' assets?	406	12.0%
What accounts are changed here?	338	10.0%
What clued you in that this event was not a transaction?	277	8.2%
Which financial statements did this transaction affect?	220	6.5%
Is this an operating, investing or financing activity?	166	4.9%
What's the difference between the journal and the ledger?	159	4.7%
Does this transaction affect the income statement?	139	4.1%
Does this transaction affect the statement of retained earnings?	119	3.5%
Does this transaction affect the balance sheet?	102	3.0%
Does this transaction affect the cash flow statement?	95	2.8%
Shouldn't we have used Services Revenue instead of Unearned Revenue?	93	2.7%
What did the business give and receive in this transaction?	78	2.3%
How do I check if this transaction kept the accounting equation in balance?	74	2.2%
How do you determine the balance of a T-account?	67	2.0%
How can I tell if this is actually a business transaction?	64	1.9%
How did you know that Cash was a debit?	61	1.8%
Is Accounts Receivable a cash equivalent?	54	1.6%
How can I tell which side of a T-account is its normal balance side?	40	1.2%
Why is this still called Rewinding Expense if it has just been paid?	36	1.1%
Hold it! If Cash goes up, how can that be a debit? Shouldn't that be a credit?	34	1.0%
Was there really an effect on the accounting equation here if the net change in assets was zero?	29	0.9%
Why do total debits and total credits always have to be equal?	29	0.9%
Are total debits and total credits equal for this transaction?	25	0.7%
Is one of the debits or credits easy to figure out in this transaction?	24	0.7%
What is something important to look for?	21	0.6%
Why is Prepaid Insurance an asset account?	17	0.5%
How did you know that Notes Payable was a credit?	16	0.5%
How did you know that Services Revenue was a credit?	15	0.4%
How did you know that Common Stock was a credit?	14	0.4%
How did you know that Accounts Payable was a debit?	13	0.4%
Isn't Cash always supposed to be written first in the journal entry?	12	0.4%
How did you know that Utilities Expense was a debit?	10	0.3%
Will Wages Expense be a debit or a credit here?	9	0.3%
How do I post to the Cash T-account?	8	0.2%
How did you know that Dividends was a debit?	8	0.2%
How did you know that Unearned Revenue was a credit?	8	0.2%
How did you know that Accounts Receivable was a debit?	7	0.2%
How did you know that Weightlifting Equipment was a debit?	4	0.1%