ISYS3401
Information Technology Evaluation

Week 6 Lecture

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Agenda

- Week 7 Mid-Semester Quiz
- Recap from Last week tutorial
- Analytical Studies
- Technological Models
- Example of Questionnaire
- Wording of Questionnaires
- Bad Example
- Constructs and Variables
- Class Activities

Week 7 Mid-Semester Quiz

Venue: Normal Monday Lecture

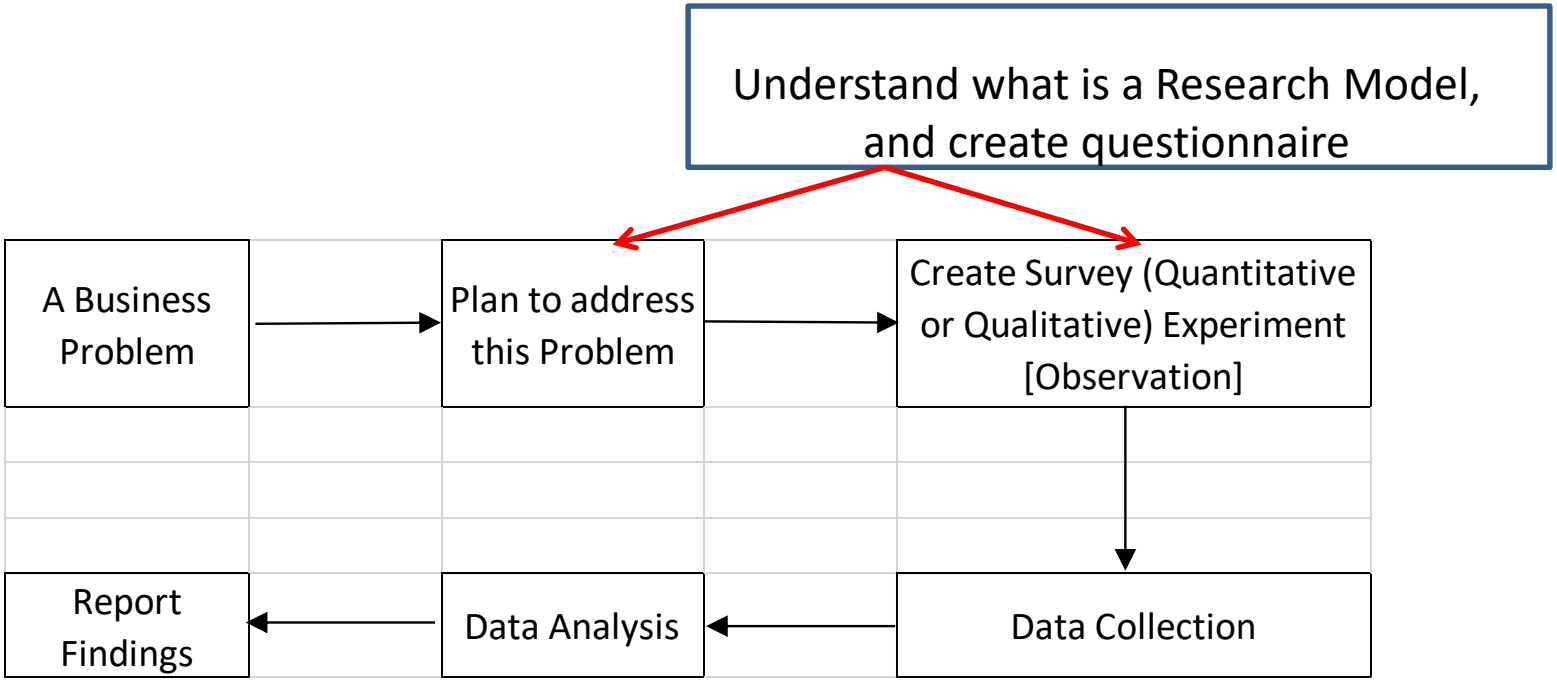
Date: Monday, 8th April, 2019

Time: 12.10pm (1hr and 10mins)

Type: Closed Book

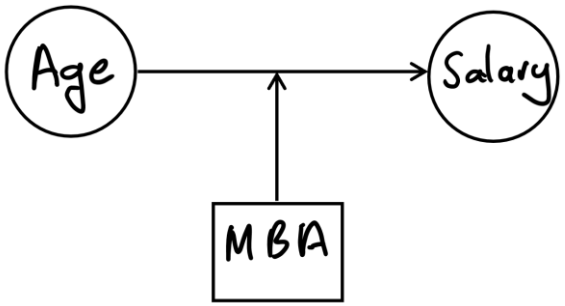
Course Assessment: 15%

This week …


Understand what is a Research Model, and create questionnaire
A Business Problem
Plan to address this Problem
Create Survey (Quantitative or Qualitative) Experiment [Observation]
Report Findings
Data Analysis
Data Collection

Last Week Tutorial

Solution 2e Model



SUMMARY OUTPUT						
Regression Statistics						
Multiple R	0.989321416					
R Square	0.978756863					
Adjusted R Square	0.976701076					
Standard Error	2005.37675					
Observations	35					
ANOVA						
	df	*SS*	*MS*	*F*	*Significance F*	
Regression	3	5743939086	1914646362	476.098288	5.31397E-26	
Residual	31	124667613.2	4021535.91			
Total	34	5868606699				
	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	3902.509386	1336.39766	2.920170772	0.006467654	1176.908389	6628.110383
Age	971.3090382	31.06887722	31.26308786	5.23658E-25	907.9436454	1034.674431
MBAFlag	-2971.080074	3026.24236	-0.98177202	0.333812767	-9143.142058	3200.981911
MBAFlag*Age	501.8483604	81.55221742	6.153705887	7.9295E-07	335.5215164	668.1752044

- The R-Square is 0.9798 or 97.98%
- The Correlation Coefficient r is 0.9893
- The linear relationship is estimated to be: y = 3902 + 971Age - 2971MBAFlag + 502(MBAFlag *Age)

References

- *Measuring the User Experience: Collecting, Analyzing, and Presenting Usability Metrics, by William Albert, Thomas Tullis,* ***Chapter 6***
- Other Ref: http://scholarcommons.usf.edu/cgi/viewcontent.cgi?article=1002&context=oa_textbooks (Chapter 5-9)

Analytic Studies

- Study of causal relationships
  - What is the cause?
  - Does this IT solution work?
  - Is this IT solution better that another IT solution

- Some useful other analytic studies
  - Cross-sectional analytic study
  - Trials (Randomized & non-randomized or Cohort)
  - Case-control studies
  - Before & after study

- By changing the parameters, the outcome could be different, for example, Eating McDonalds for a month – Exercise versus No exercise.

Cross Sectional Analytic

- Selection of subjects is NOT on the basis of either study factor or outcome factor
- More an association than causality study
- How big, or how strong is the association between the study factor and the outcome factor ?
- Example:
  - Does IT graduates get more pay then non-IT graduates in the first 2 years of after their graduation
  - Both salary (outcome) and degree (IT/non-IT) could be examined in a survey.

Case-control Versus Cohort

- In Cohort study:
  - begin with a group subjected to study factor (antivirus installed) and a group not subjected to study factor (no antivirus); "controls")
  - follow them forward in time to see who achieves the outcome factor (virus infected)
  - "Control" = subjects without the "study factor"
- In case-control:
  - begin with a group in whom outcome is known: e.g. virus infected (cases) and a group of computers without virus infected (controls)
  - assess their past history of installing antivirus (study factor)
  - "Control" = subject without the outcome (referent group)

IT Evaluation – User Perspective

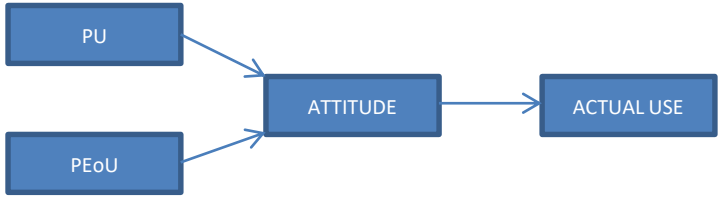
- Involves the assessment of information technology & systems
- Use of computing, networks and communications to support and improve organizational outcome
- Models and frameworks have been proposed from information systems literature including:
  - Technology and user based models
  - Organisational maturity and readiness models

Technology focused models

- To a large extent, IT evaluation stem from two generic frameworks:
  - DeLone and McLean's IS success model (1992)
  - Technology Assessment Model (TAM) (1989)

TAM Model

- IT expected to be one of the important mechanism reforming they in the future.
- An important research question in the IT domain is to study **users' Attitude** towards using the system. Based on prior researches in the IS field called Technology Acceptance Model (TAM) – Davis (1989),
- One may make the following hypotheses :
  - The attitude towards using the information system would be positively affected by Perceived Usefulness (PU) of the system.
  - The attitude towards using the information system would be would be positively affected by the Perceived Ease of Use (PEoU) of the system.
  - User's attitude towards the information system will in turn affect users' actual usage of the system.



Definitions in TAM:

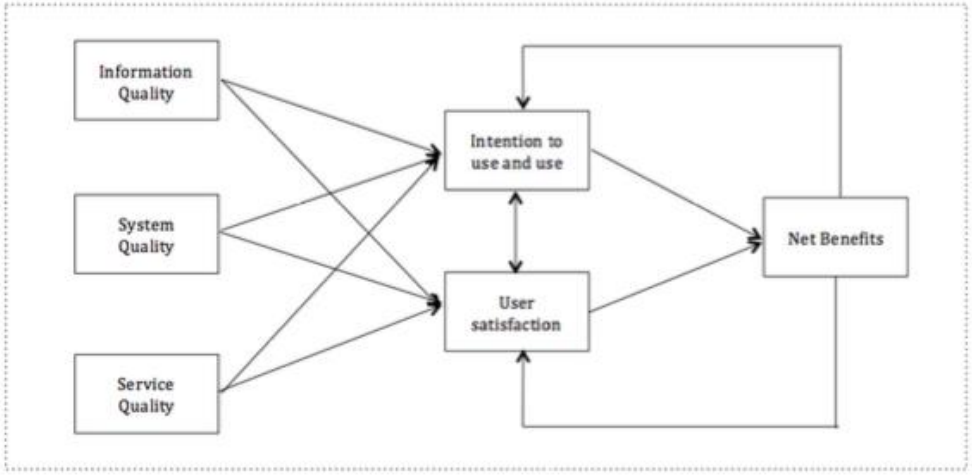
https://www.youtube.com/watch?v=ydIFH1q2NHw&t=5s

Davis (1989)

- **Perceived usefulness** (PU) – This was defined by Fred Davis as "the degree to which a person believes that using a particular system would enhance his or her job performance".
- **Perceived Ease of Use (PEoU**) – Davis defined this as "the degree to which a person believes that using a particular system would be free from effort"

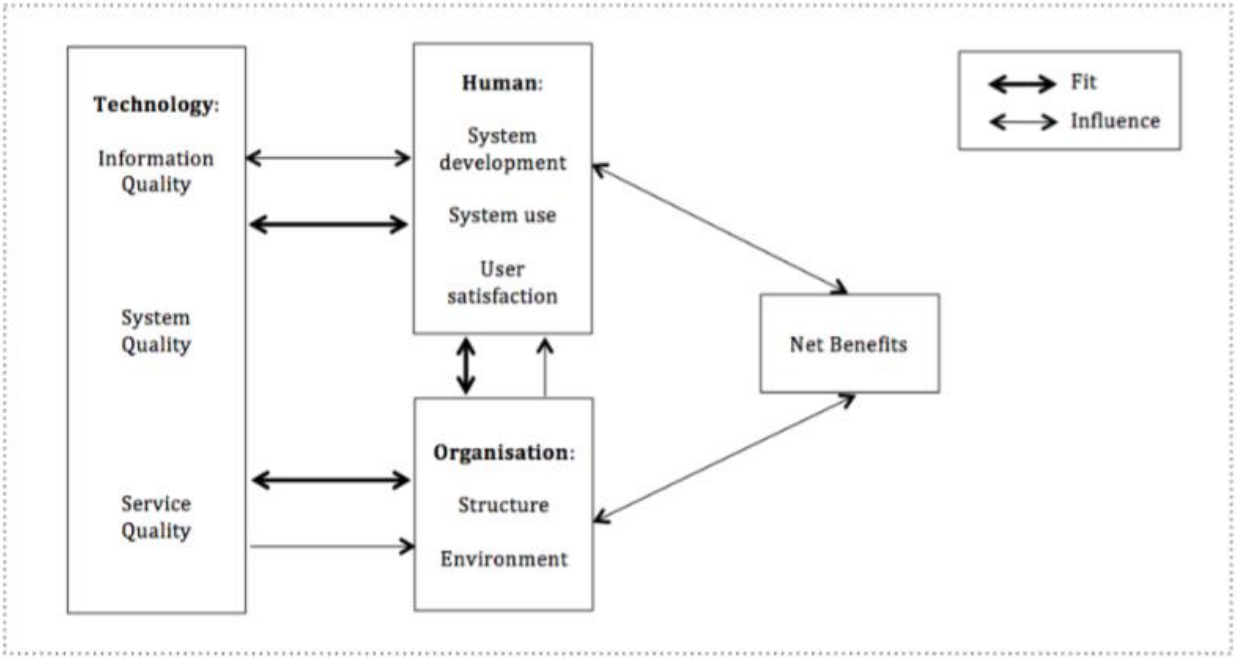
DeLone and McLean's IS success model

- Comprehensive model
- Focuses on technological effectiveness and quality
- Lack of focus on human and external factors



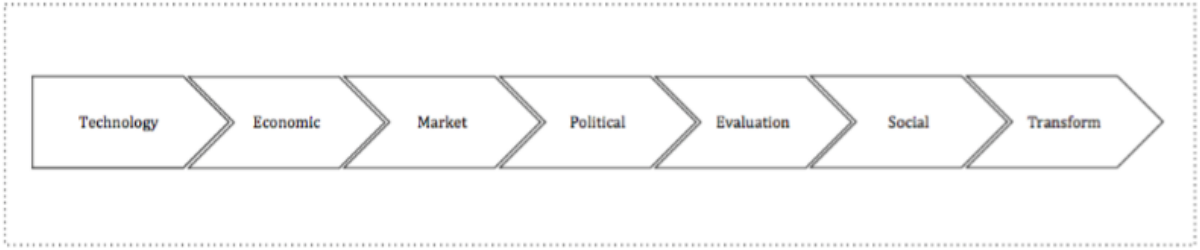
Modified DeLone and McLean's IS success model

- Used as a basis for other frameworks
- Combines technology factors with other factors that are specific to Benefits



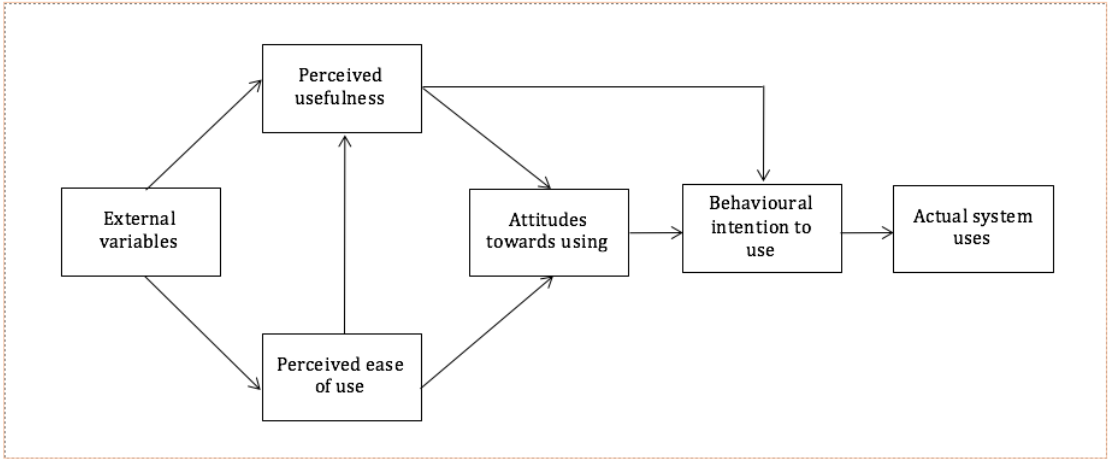
IS models

- Combinations of models have been proposed to capture elements specific to business and technological systems
  - TAM and IS success model
  - Task Technology Fit (https://www.youtube.com/watch?v=R9UGr5SpzlQ)
  - Technology, economic, political, social



Technology Acceptance Model

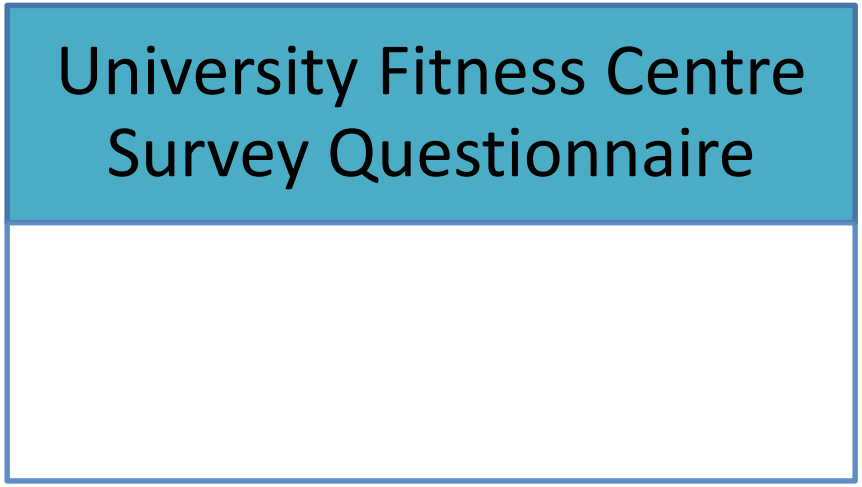
- Popular model due to its simplicity
- Factors to determine use and acceptance of IT within organisations



Latent Constructs & Items: An example

Items		Source
Perceived Usefulness		
PU1	I think that using the Social Media improves job quality	[16]-[18], [49], [71], [75]
PU2	I think that using the Social Media increases productivity	
PU3	I think that using the Social Media enhances our effectiveness on the job	
PU4	I think that the Social Media are useful in my job	
PU5	Using Social Media raises our chances to increase our profits	
PU6	I think that the advantages of using the Social Media outweighs the disadvantages	
PU7	Overall, I think that using the Social Media is advantageous to our company	
PU8	I think that using Social Media enables us to access a lot of information	
PU9	I think that using the Social Media provides us with information that help us make better decisions	
Perceived Ease of Use		
PEOU1	I think that learning to work with the Social Media is easy	[16]-[18]
PEOU2	I think that it is easy to get the Social Media do what we want it to do	
PEOU3	I think that interacting with the Social Media is clear and understandable	
PEOU4	I think that it is easy for us to become skillful at using the Social Media	
PEOU5	I think that it is possible to use the Social Media without expert help	
PEOU6	Overall, I think that Social Media are easy to use	
Attitude		
A1	I think that using the Social Media is a good idea	[16]-[18], [25], [53]
A2	I think that using the Social Media is a wise idea	
A3	I think that using the Social Media is a positive idea	
A4	I like the idea of using the Social Media	
Intention to Use		
IU1	It is probable that I will use or continue using the Social Media	[16]
IU2	I intend to begin or continue using the Social Media	
IU3	I will frequently use Social Media in the future	
IU4	I will recommend others to use the Social Media	
Use		
USE1	On the average, how frequently do you use the Web 2.0?	[16]-[18], [71]
USE2	How frequently do activities related to organizational of Social Media take place?	
Perceived Strategic Value		
PSV1	Reduce costs of business operations	[32]
PSV2	Improve customer services	
PSV3	Improve distribution channels	
PSV4	Obtain operational benefits	
PSV5	Provide effective support role to operations	
PSV6	Increase ability to compete	
PSV7	Provide to managers better access to information	
PSV8	Provide managers access to new methods and models when making decisions in functional areas	
PSV9	Improve communication within the organization	
PSV10	Improve the productivity of managers	
PSV11	Support strategic decisions of managers	
PSV12	Provide information for strategic decisions	

Example of Questionnaires



Survey Instrument example (1)

In order to improve the quality of service for our valued members, we would like to know your perceptions on various issues related to the University Fitness Center (UFC). Please take a couple minutes to assist us.

1) Which of the following best describes your membership type?

- ☐ Corporate
- ☐ Individual
- ☐ Family
- ☐ USYD Faculty/Staff
- ☐ USYD Student
- ☐ USYD Alumni

2) How often do you attend the UFC?

- ☐ Every Day
- ☐ 2-3 times/week
- ☐ 4-6 times/week
- ☐ Once a month
- ☐ Once a week
- ☐ Rarely ever

3) What time of day do you typically visit the UFC?

- ___ Morning
- ___ Mid-day
- ___ Afternoon
- ___ Evening

Survey Instrument example (2)

4) What is the primary reason that you joined the University Fitness Center? (check only one)

__ Location __ Personal instruction __ Price __ Classes __ Hours of operation __ Facilities

5) How did you find out about the UFC?

__ Health Care Provider	__ TV	__ Friend/Family
__ Newspaper	__ Radio	__ Co-worker
__ Advertising board/banner	Other _____	

6) What activities do you find yourself enjoying most at the University Fitness Center?

__ Weight room	__ Water fitness	__ Cardio theater
__ Basketball	__ Cycling classes	__ Indoor track
__Lap/Open swimming	__ Aerobics classes	

Survey Instrument example (3)

7) Please rate the quality of these features of the UFC:

	Excellent				Poor
Customer Service	☐5	☐4	☐3	☐2	☐1
Cleanliness	☐5	☐4	☐3	☐2	☐1
Class Instruction	☐5	☐4	☐3	☐2	☐1
Assistance w/workout	☐5	☐4	☐3	☐2	☐1
Variety at Juice Bar	☐5	☐4	☐3	☐2	☐1
Equipment availability	☐5	☐4	☐3	☐2	☐1
Locker rooms	☐5	☐4	☐3	☐2	☐1
Class times	☐5	☐4	☐3	☐2	☐1
Hours of operation	☐5	☐4	☐3	☐2	☐1
Prices at Juice Bar	☐5	☐4	☐3	☐2	☐1
Equipment quality	☐5	☐4	☐3	☐2	☐1
Class variety	☐5	☐4	☐3	☐2	☐1
Cost of membership	☐5	☐4	☐3	☐2	☐1
Friendliness of staff	☐5	☐4	☐3	☐2	☐1

Survey Instrument example (4)

8) What features of the UFC would you like to see added or changed?

_____

9) How often do you participate in the following classes at the UFC:

	Never				Often
Aerobic Classes	1	2	3	4	5
Martial Arts/Kickboxing	1	2	3	4	5
Yoga Classes	1	2	3	4	5
Dance/Exercise Classes	1	2	3	4	5
Pilates/Exercise Classes	1	2	3	4	5
Cycling Classes	1	2	3	4	5
Water fitness	1	2	3	4	5
Ballroom dance	1	2	3	4	5

10) Would you recommend the University Fitness Center to others?

___ Yes ___ No

Survey Instrument example (5)

11) Please rate these incentives on their effectiveness in getting you to convince one of your friends to join.

	Ineffective				Effective
Coupon for the Juice Bar	☐1	☐2	☐3	☐4	☐5
Free month locker rental	☐1	☐2	☐3	☐4	☐5
Free UFC t-shirt	☐1	☐2	☐3	☐4	☐5
Free Micro-fit test	☐1	☐2	☐3	☐4	☐5
Free month's membership for referring new members	☐1	☐2	☐3	☐4	☐5

12) Overall, on a scale of 1-10, with 10 being highest, how satisfied are you with your experiences at the University Fitness Center?

Dissatisfied Satisfied

1 2 3 4 5 6 7 8 9 10

Survey Instrument example (6)

13) Please circle the age range that applies to you.

<=16	17-20	21-24	25-28	29-32
33-36	37-40	41-44	45-48	49-52
53-56	57-60	61-64	65-70	70

14) What is your gender?

___ Female ___ Male

15) What is your zip code?

_____

16) Any additional comments or suggestions?

_____

_____

_____

Thank you for completing this survey, your responses are greatly appreciated.
Have a Great workout!

Wording of questionnaires – key considerations

No ambiguity in the wording

Unbiased	Appropriateness	Intelligibility: it should be easily understood	Validity and reliability
Logical order	Capable of coping with all possible responses	Easily coded	Pretested, open to close/structured
And / Or	Not	Ethical	Clear use of Language

Traps to avoid

- Example:
  - Are you satisfied with the website design or the processing speed of the enrolment system?
    - YES/NO

- Does a YES response refer to:
  - Website design only?
  - Processing speed only?
  - Website design and Processing speed?

- If this distinction is important, divide this question into 2 separate questions

Example

- Do you agree of disagree with the following statement:
  - IT Project Manager should *not be held responsible* for the failure of the project
- Reword to avoid the use of *not:*
  - IT Project Manager should be held responsible for the failure of the project
- Is money is not a problem, then what action would you take?

Example of poor questions

- Example from our experience
- Problem: towards – the end of your information system project, you need to measure the satisfaction of your client
- Naïve solution:
  - Email your client a short questionnaire contains two questions
    1. Are you satisfied with the system we developed? YES/NO
    2. Are you going to use the system in the future? YES/NO
  - Declare success to course coordinator because client answered ‘yes’ to both questions.

Correct Approach

- First decide what are the key concepts/constructs about which data needs to be gathered:
  - Develop the construct in terms of specific things that constitute the construct:
  - For example, Client satisfaction on the system
    - Construct level
    - Content Ease of Use
    - Format
    - Timeliness of information
    - More detailed variable level:

  - complete accurate ease of Information retrieval update etc.

Constructs and variables

Constructs

- Concepts, often complex
- Not directly measurable
- Constructs are usually collectively measured by a group of variables

Variables

- Something we can measure
- Concrete measured expressions to which we can assign numeric values
- Factual or Opinion (or attitude)

Questionnaire Design

- Designing individual questions (items)
  - Adopt questions used in other questionnaires
- More information about survey instruments in
  - (http://www.ischool.utexas.edu/~palmquis/courses/survey.html)
- Lots of instruments (questions) reported in academic papers
  - Adapt questions used in other questionnaires
  - Develop your own

Questionnaire Design

- Open-ended question
  - Respondents answer in their own words
- Closed-ended question
  - Respondents choose a response from those provided
- Examples
  - Why do you blog? (OPEN)
  - Which one of the reasons make you start your first blog?
    - share daily activities as well as pictures with family members
    - share information on a particular hobby
    - it makes me look cool
    - other reasons

Open vs. closed ended questions

Open-ended question

- Great freedom for respondent to answer
- Responses may be ambiguous
- Coding is time-consuming and costly
- Entail more work from respondents
- Mainly to understand Why? or How?

Closed-ended question

- Require less effort and less facility with words
- Difficult to develop good closed questions
- Recommendation for designing closed-end question: use open
- questions in preliminary interviews or pre-tests
- Mainly to confirm

Closed ended questions

List	The respondent is given a list of choices, any of which may be selected (e.g. checklist)
Category	Only one response can be selected (e.g. multiple-choice)
Rank	Respondent is asked to place something in order (e.g. rank order)
Rating or Scale	A rating device is used to record response (e.g. likert scale, rating scale, guttman "cumulative" scale)
Quantity	Response is a number giving the amount

List question

- E.g.
  - Please choose all communication tools you ever used in campus.
    - Internal Message Board
    - Paper Plane
    - Canvas
    - E-mail
    - Other _____

Category Question

- Each respondent's answer can only fit one category
- E.g.
  - How often do you visit this shopping centre
    - Once a week
    - Twice a week or more
    - Less than once a week
- What's wrong with this responses?

Ranking Question

- Rank-order the three most important things you want in the job you make your life's work?
  - 1 indicates the most important one 4 the least important one
- Should not ask respondent to rank more than four levels
- OK to offer more responses than being ranked
  - _____ Making a lot of money
  - _____ Being creative
  - _____ Being free from supervision
  - _____ Having opportunities for advancement
- In ***telephone questionnaire, should not ask respondent*** to rank more than four responses

Rating or scaling

- Likert-style question
  - Ask respondents how strongly they disagree or agree with a statement or a series of statements
  - Odd number or even number scales
- Odd number offers a neutral choice
- Even number force respondents to make a choice
- For the following statement please circle the number that matches your view most closely
  - I feel that employee's views have influenced the decisions taken by management.

1 2 3 4 5

Strongly Disagree Strongly Agree

Vague and Ambiguous questions

- Do you have any trouble with your internet connection?
  - What does '***trouble" mean? Physical connection?***

- Do you normally surf the internet? Choose: Always, Regularly, Usually, Sometimes, Never
  - Be specific!! Avoid imprecise terms such as 'often', 'occasionally', etc…

Leading Questions

- "Do you think the present design of the Information system should involve you?"
  - Bias to yes!!
  - "Do you think the present design of the Information system **should, or should not involve you?"**

- "Are you satisfied with the present provider?
  - "Are you **satisfy or dissatisfied with the present** provider?
  - Note: **dissatisfied is more extreme than not satisfied**

Testing Knowledge

- Avoid testing knowledge

  This can intimidate the respondent

  1. "What types of computer malicious attacks can be prevented by anti-virus software?"

  2. "Do you happen to know what types of computer malicious attacks can be prevented by anti-virus software?" YES /NO

  If YES, ask "Which types of attacks?"

General Rules of Thumb

1. Communicate with the lowest, rather than the average, level of the target group
2. Using as few words as possible (keep questions short)
3. Use simple words (plain English, nontechnical lay terms)
4. Check the meaning of the words with a dictionary and thesaurus.

Pilot Testing

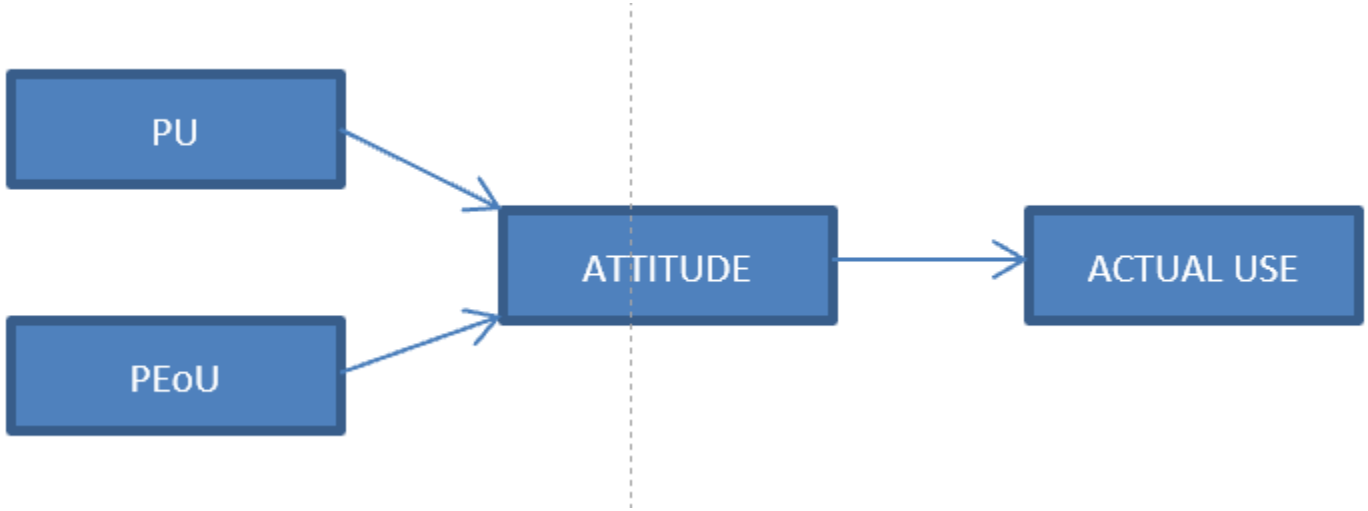
- Purpose is to refine the questionnaire
  - respondents will have no problems in answering them
  - You will have no problems in recording the data
  - Obtains some assessment of the questions' validity and reliability of the data

- Steps
  - Ask expert or group of experts to comment on the representativeness and suitability of the questions
  - Administer the questionnaire to a group as similar as possible to the final population in your sample.

Class Activities

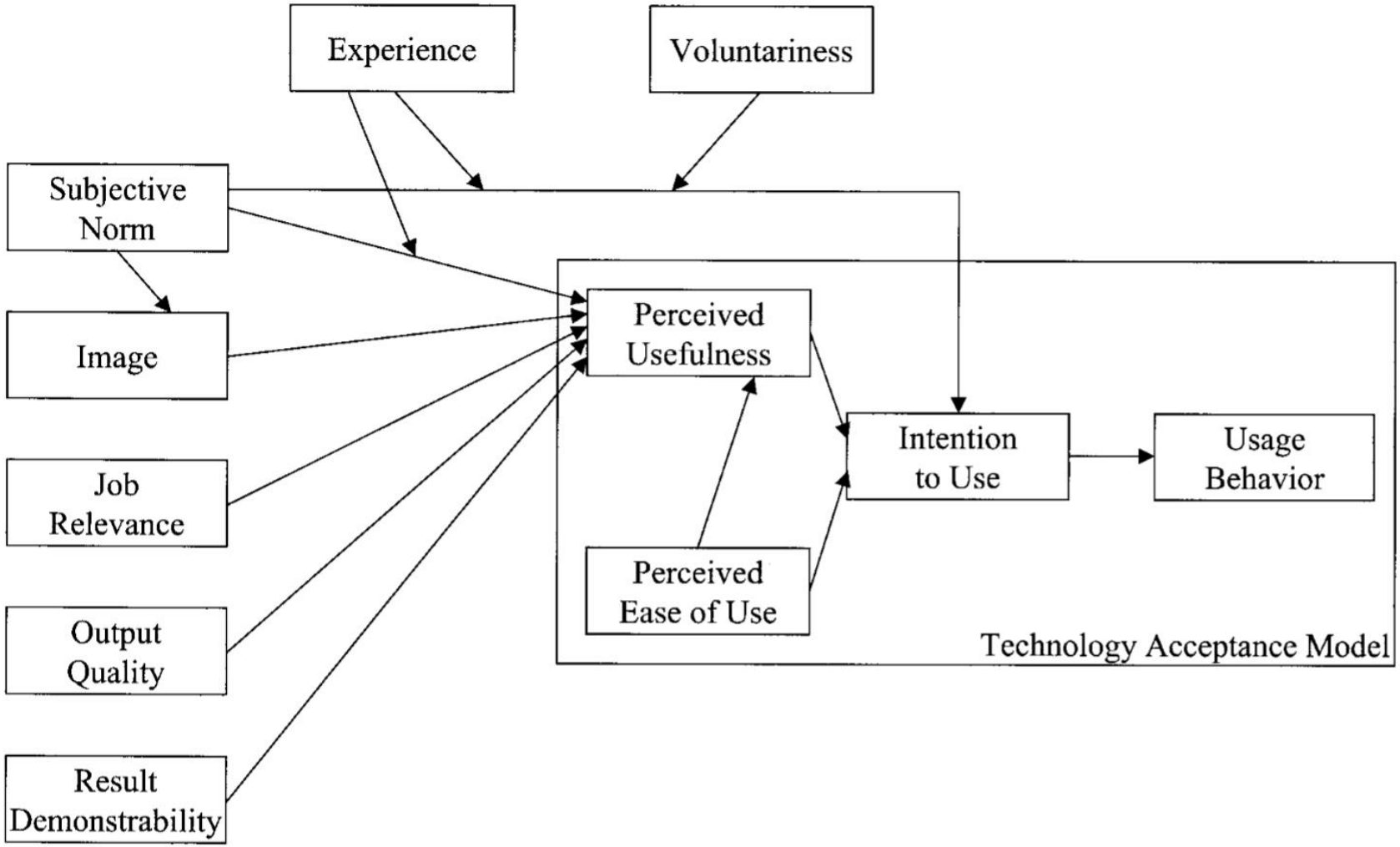
- Search how TAM evolves over time.
- IS Success Model

TAM (Davis 1989)



TAM 2

Figure 1 **Proposed TAM2—Extension of the Technology Acceptance Model**



Unified Theory of Acceptance and Use of Technology (UTAUT)

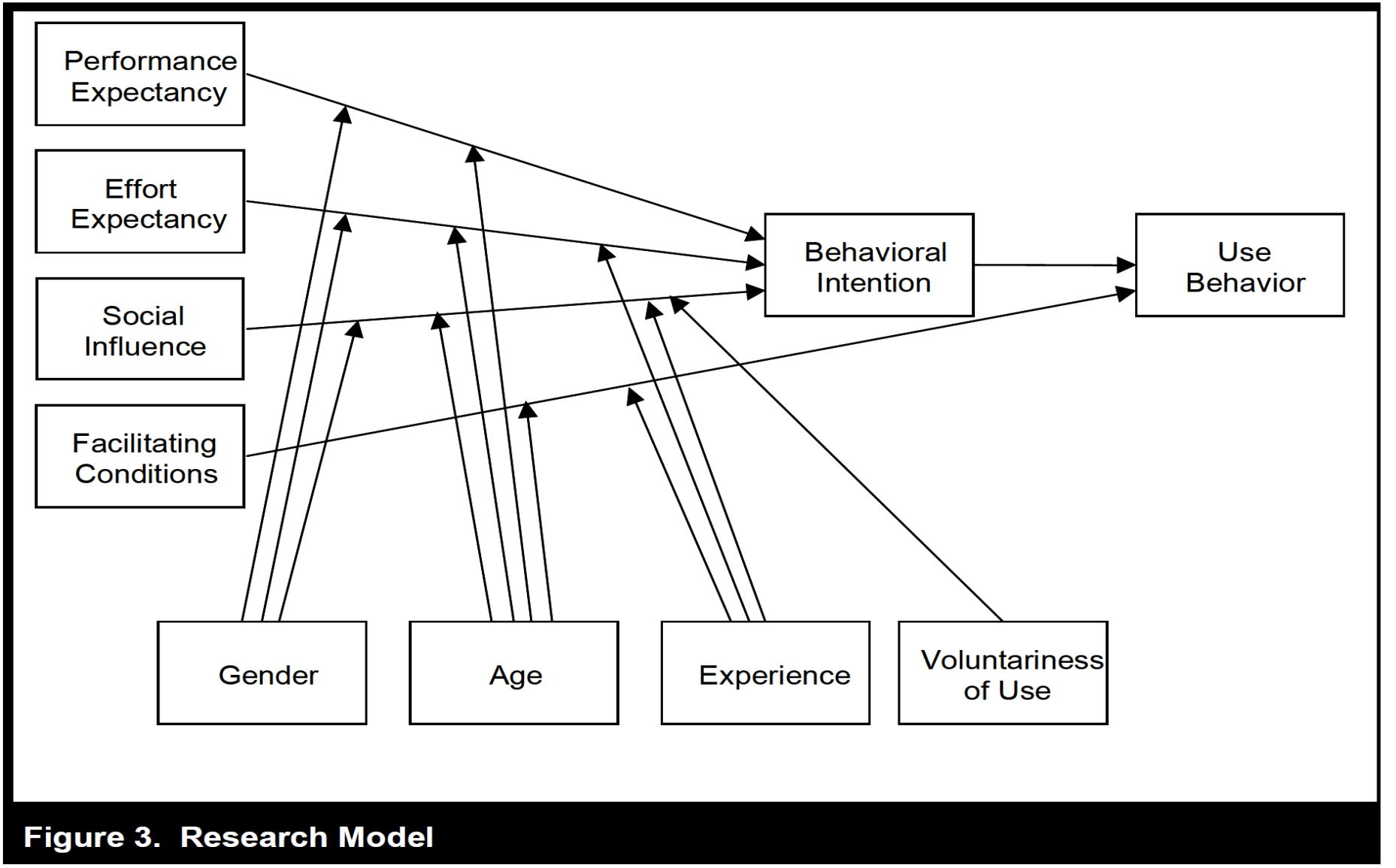
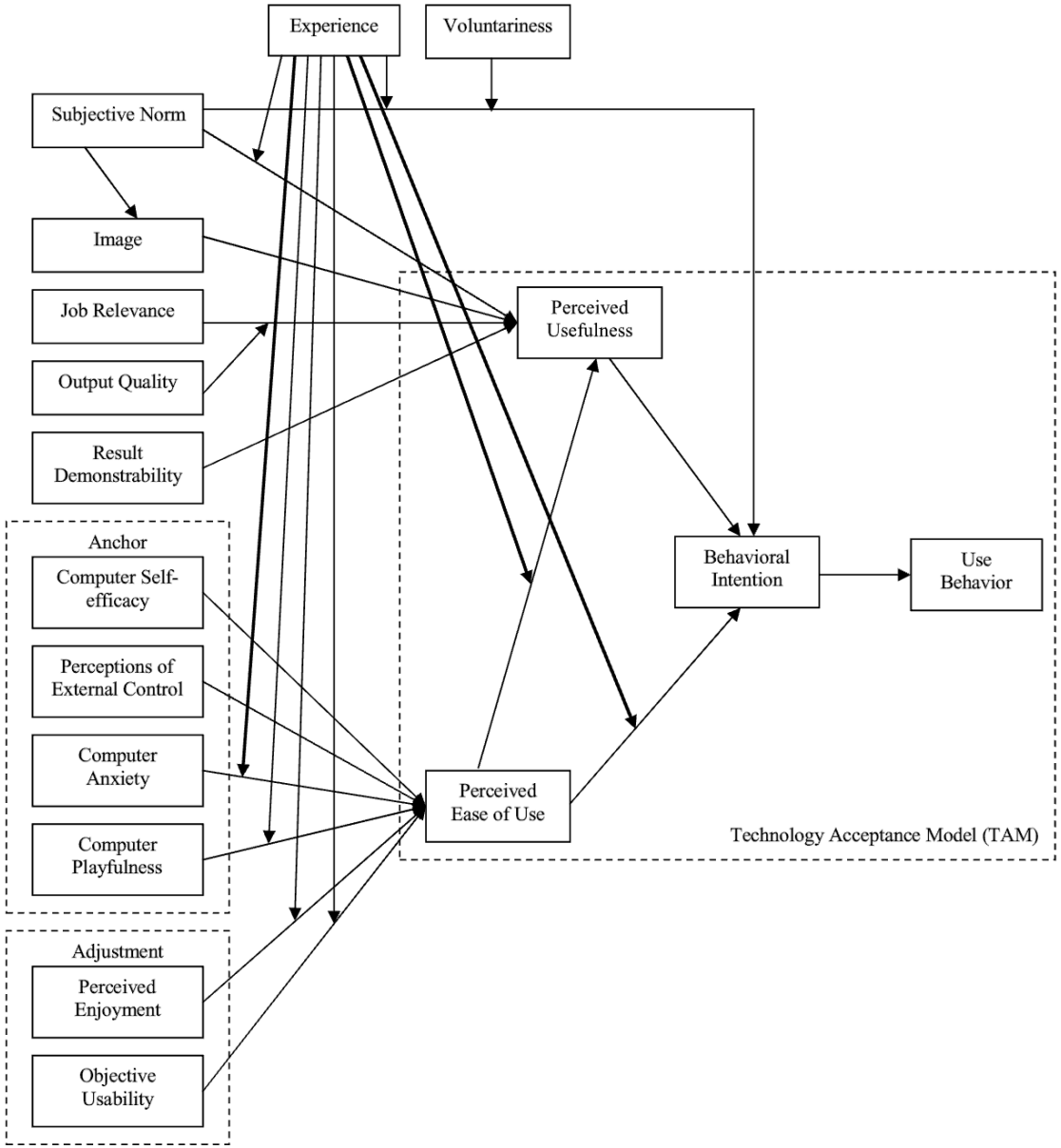


Figure 3. Research Model

TAM 3

Figure 2: Technology acceptance model 3 (TAM3)[a].



[a]Thick lines indicate new relationships proposed in TAM3.