

**UNLV Personal Response System (“Clickers”)
Working Group Report**

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**Patrick Griffis (Chair)
Darrell Lutey
Eva Stowers
Joseph Valenzano III
Michael Wilder**

<http://www.unlv.edu/Provost/committees/CCTL/prs.html>

Contents

Executive Summary.....	3
Environmental Scan/Information Gathering.....	4
Criteria for PRS Clicker System Evaluation.....	5
Faculty Focus Group and Campus Forum.....	6
On-Campus Demos of PRS Clicker Systems.....	7
Issues, Concerns and Best Practices.....	7
System Cost to Student.....	14
Selection of Clicker Systems for Further Evaluation.....	14
Recommendation of Campus Standard with Rationale.....	16
Policies & Procedures for PRS Standard Adoption and Implementation.....	18
PRS Clicker Support Plan.....	20
APPENDIX A: Timeline of Major Events.....	24
APPENDIX B: List of Clicker Systems Used on Campus.....	26
APPENDIX C: PRS (Clicker) Survey for Current Users.....	27
APPENDIX D: Results of Web Based Survey.....	28
APPENDIX E: Ranked List of Criteria for Deciding on PRS Standard.....	29
APPENDIX F: Faculty Teaching and Learning Objectives.....	30
APPENDIX G: Clicker Models Strengths and Weaknesses.....	31
APPENDIX H: Clicker Product Evaluation Matrix.....	33

Executive Summary

Interwrite has been selected for recommendation as the campus Personal Response System (PRS) standard. The major reasons for the choice of Interwrite are:

- the flexibility of Interwrite software for accommodating use with PowerPoint and use outside of PowerPoint;
- the ability of Interwrite to accommodate the practice of instructors providing a loaner clicker device to students to use in the event they forget their own device;
- Interwrite's considerably larger staff and more robust resources to devote to training and supporting new and existing clicker users; and
- the cost of Interwrite clickers to students is considerably less than the cost of most other PRS systems.

Upon receiving its charge from the Committee on the Culture of Teaching and Learning (CCTL), the Personal Response System (PRS) Working Group conducted background research on Clickers and began building a knowledge base website to promote campus-wide education about these systems. The Group then gathered information from UNLV faculty through a process of directed e-mail to current clicker users, two user focus groups, and an online survey to the entire UNLV Faculty. The UNLV community was also invited to PRS presentations by four vendors: I>Clicker, eInstruction, Interwrite, and Turning Point. Based on feedback gathered from faculty and using an evaluation matrix, the PRS Group eliminated I>Clicker and eInstruction from further consideration and undertook trials of the Interwrite and Turning Point systems during which the training provided by these two companies was evaluated. Recommendations for implementation and support of the Interwrite system are provided in this report.

Environmental Scan/Information Gathering

The PRS Working Group began work by conducting some background research about clicker use in higher education and standardization initiatives at other higher education institutions. This resulted in the Personal Response Systems ("Clickers") Resource List which is currently housed and maintained on the Teaching and Learning Center's website <http://tlc.unlv.edu/tech/clickers.htm>. Simultaneously, the group worked determining which clicker systems were currently being used at UNLV and compiling a list of faculty currently using clickers in the classroom. Our group obtained a list from the UNLV Bookstore of the clickers systems that were ordered in the spring semester of 2007 and this list provided information on the classes which used each clicker system. See Appendix B for the actual list.

Our group was able to cross reference this list with class schedules to determine the faculty members using these products. Additionally, our group solicited contacts they had to add names to this list. One member of the PRS Working Group solicited names from the College of Urban Studies and another member solicited names from the School of Nursing. This list was compiled for the purpose of emailing faculty using Clickers on campus to invite them to participate in a web based survey and/or focus group discussions. The chair of the PRS Working Group was contacted by Tish Smyer, Assistant Dean for Academic Affairs regarding the positive experience of the School of Nursing with the use of the I>Clicker System. The chair requested that Tish pass along the invitation email for participating in the survey and/or discussion groups which she graciously did. The group ended up with a list of 21 faculty members. These faculty

members represented the departments of Accounting, Communication Studies, Chemistry, English, Economics, Geosciences, Journalism and Media Studies, Psychology and Physics as well as the School of Law, the School of Life Sciences and the School of Nursing.

The PRS Working Group compiled an open-ended survey for these faculty members to elicit their perspectives and concerns over the use of clickers on campus as well as their perspectives on their current clicker system. The chair of the PRS Working Group sent an email to the list of 21 faculty using clickers inviting them to complete this Word Document survey. See Appendix C for the actual survey. The chair received 10 completed survey responses.

Criteria for PRS Clicker System Evaluation

The answers to Question 2 of the survey helped our group to develop a list of criteria for selecting a PRS Clicker system as the campus standard. This list of criteria was used to create a web based survey which asked participants to rate the criteria items in order of importance to them. An invitation to participate in this web based survey was sent from Patricia Iannuzzi (chair of the Committee on the Culture of Teaching and Learning) via UNLV Official email. To see all the results of the web based survey, follow the directions in Appendix D. See Appendix E to view only the listing of criteria ranked in order of importance from the results of the web based survey. The results listed in Appendix E provided the PRS Working Group with a ranking of the criteria that was of most importance to faculty members who are have already selected or are considering selecting clickers for teaching or other purposes.

Faculty Focus Group and Campus Forum

Additionally, the PRS Group Chair invited the list of faculty members currently using clickers to a Focus Group where our group further learned the concerns and perspectives of faculty members using clickers. The Focus Group was held on April 27th, 2007 and five faculty members attended. The discussion was open-ended allowing members of the PRS Group to ask participants questions and for the participants to ask members of the PRS Group questions. This discussion benefited the group in educating its members on the issues and concern of faculty members regarding clickers and benefited the faculty members who were able to learn more about clickers from each other. Some faculty members even commented that they discovered new ways to use clickers and learned more about the strengths and weaknesses of other clicker systems from this discussion. Moreover, an invitation to participate a Campus Open Forum on Clickers was sent from Patricia Iannuzzi via UNLV Official email. The Campus Open Forum on Clickers was held on May 4th, 2007 and three members of the teaching faculty attended, two of which had attended the previous Focus Group. The faculty member who had not participated in the Focus Group used clickers for determining the effectiveness of televised commercial advertisements and other visual media. There was a lively discussion on the features of clickers which were most important from which it became clear that any clicker system selected would need to accommodate a wide variety of potential uses.

On-Campus Demos of PRS Clicker Systems

The PRS Working Group then invited four PRS Clicker Vendors to campus to demo their product. The vendors invited were PRS Interwrite, I>Clicker, eInstruction and Turning Point. Invitations to participate in these vendor demos were sent from Patricia Iannuzzi via UNLV Official email. Below are the dates the campus demos were held.

May 4th: Campus Clicker Vendor Demo for PRS Interwrite.

May 15th: Campus Clicker Vendor Demo for I>Clicker.

May 16th: Campus Clicker Vendor Demo for eInstruction.

May 21st: Clicker Vendor Demo for TurningPoint Technologies.

All four demos were video recorded and edited for sound and video quality so that the PRS Working Group could provide a DVD or VHS copy of the demos for anyone on campus who would like to see the demos.

Issues, Concerns and Best Practices

As explained in the preceding section, the PRS Working Group gathered information from Faculty through directed e-mail to current clicker users, two user focus groups, and an online survey to the entire UNLV Faculty. Faculty were also invited to vendor presentations by I-Clicker, E-Instruction, Interwrite and Turning Point. The following are some important considerations in the use and selection of PRS Clickers which were discovered through the work of the PRS Working Group.

Students

Instructors believe that the major concerns of student about clickers are ease of use, portability, and cost. They also report that students worry about clicker reliability when it affects their grade. A clicker that gives an acknowledgment that the student's response was received would help mitigate that concern. Most instructors and vendors agreed that clickers should not be used for high-stakes exams. One vendor warned against their use for exams because of a risk of "spoofing."

A major issue that was brought up during the Focus Group and the Campus Forum was how to handle situations where students do not bring their required clicker device to class. Some faculty had a few spare clickers they would loan out to such students for the class period. However, other faculty objected to this practice under the rationale that this would provide little incentive for students to bring their clickers to class. One solution to this problem was to allow students some leeway in participation points by allowing students to miss participating in clicker activities a certain number of times before penalizing them. The practice of loaning clickers depends largely on whether a student can link the loaned clicker to their student information so that they can receive credit for their answers. PRS Interwrite is the only system of the four that allows students to easily connect a loaner clicker to their student information. This is a major differentiating strength for Interwrite as the group wanted faculty to have the option of providing loaner clickers if they so wish. One PRS Interwrite Clicker can be shared by students and used in different classes occurring at different times.

This raised another issue of how to prevent students from participating on behalf of other students who may be absent for that class. Most agreed that the practice of missing class is not often premeditated and that students would not likely plan to arrange for another student to participate for them in their stead in enough time for such plans to work. As such, many agreed that this practice was infrequent enough not to pose a significant threat of cheating. Others felt that the threat of cheating was proportional to how much weight clicker participation is given in course grading and that as such, clicker participation should not have large stakes for students. However, others prefer to use clickers for large stakes assignments, quizzes and exams thereby rendering the possibility of a student answering on behalf of another student a significant issue.

Current clicker users reported mixed student satisfaction with clickers. One student commented that they didn't like clickers because they forced them to do the reading and go to class. In one department one-half to one-third of the students disliked them for the following reasons: cost, unreliability, registration, and difficulty in learning how to use them. In another department, an anonymous survey indicated that students felt they learned more but didn't like the cost.

Equipment/Software

All agreed that RF (Radio Frequency) clickers should be selected because IR (Infrared) clickers are unreliable in a classroom setting. Clicker device concerns included durability, battery life and cost of replacement batteries. Reliability and flexibility of clickers, software, and receivers are essential. The group discovered that faculty are likely to use a

PRS for a variety of purposes with a variety of teaching delivery tools. For instance, some faculty only desire a simple PRS with very limited input capabilities (Multiple Choice I>Clicker) under the rationale that if a PRS has many features, it will be more complicated for faculty to use and will be more of a distracting toy for students. While this is a credible position, it does not take into account the needs of faculty who wish to have their students input text or numerical answers. Faculty in Physics or Accounting and many other disciplines may desire students to input text and/or numerical answers which requires a system with multiple input capabilities. Resultantly, the ideal system for all potential users must be multi-functional, offering the ability to do multiple-choice, True/False, numeric answer (important to Accounting), or text responses.

Another instance of differing use of clickers involves the platform whereby faculty host their content. Instructors that do not use Power Point would prefer clicker software that does not require its use. While many faculty prefer using PowerPoint slides in class, others prefer using a word processor and/or Internet sites. Our group was committed to selecting a system which does not require faculty to adjust their teaching style to use and evaluated the ability of each system to accommodate diverse teaching styles. Of the four systems we evaluated, PRS Interwrite had the greatest ability to accommodate multiple inputs and the use of different teaching aids. One of Turning Point's greatest weaknesses was that it required a separate piece of software for those who want to use PowerPoint and for those who do not requiring faculty to decide whether they wanted to teach entirely in PowerPoint or entirely without it. PRS Interwrite allows users to jump back

and forth between using PowerPoint, a word processor and Internet sites with ease under one piece of software.

The ability to offer self-paced quizzes, where students can work at their own speed, is also important to most instructors as is the ability for the clicker software be integrated with Web Campus gradebooks and rosters. They would prefer a seamless integration to having to massage data in order to import it into Web Campus. Turning Point was the only system of the four that offered seamless integration with WebCT (Web Campus).

ADA Compliance

Another important consideration for PRS use is ADA Compliance. All four systems have Braille on the input devices for the benefit of users who have a visual impairment.

Additionally, eInstruction, TurningPoint and PRS Interwrite all have virtual input devices whereby answers can be input via a virtual keyboard much like a virtual calculator. Such on-screen virtual keyboards are typically designed for anyone with a disability that prevents him or her from typing on a physical computer keyboard. The inclusion of Braille on clickers and virtual keyboard input devices are two major provisions for ensuring that PRS Clickers are ADA Compliant.

Support/Training

Many current clicker users want better communication between other users on campus who could help each other. Suggestions included designating faculty experts who could help novices and convening a campus discussion on how clicker use changes instruction.

Current users received training from a vendor and expressed varying levels of satisfaction. Training methods included: reading the manual, online videos, web conference sessions, and vendor presentations. While most expressed satisfaction with vendor support, users wanted local help with technical issues. Responsiveness of technical support is important.

Best Practices in Teaching and Research

For a detailed account of Faculty Teaching and Learning Objectives in using Clickers, see Appendix F. Clickers are used effectively for quizzes (a “time-saver in a large lecture class”), instant polling, attendance, evaluating student comprehension of required reading, gauging student understanding of lecture material, and fostering classroom discussion/participation. A major pedagogical underpinning of Clicker use is in support of the Peer Instruction Method advocated by Dr. Eric Mazur, Professor of Physics at Harvard University. The Peer Instruction Method is an interactive teaching style which engages students in learning through reading quizzes, and conceptual exam questions. The appeal of this method is that it has been shown that to have a positive impact on student retention and learning. Clickers represent a major teaching tool which supports Peer Instruction activities such as group discussions to answer conceptual questions. For more on Dr. Eric Mazur’s Peer Instruction Method, visit the Teaching and Learning Center’s Personal Response Systems ("Clickers") Resource List at <http://tlc.unlv.edu/tech/clickers.htm>. This resource list also includes many other articles on how to effectively use Clickers for classroom instruction.

Using clickers in class has a definite impact on how a class is taught. As one faculty member pointed out, clickers are just technology – in using them one can foster active learning. Both the professor and student enjoy immediate feedback. The teacher can tell if the students understand lecture material and adjust the lecture accordingly. Students know how well they are doing before the exam. One professor not only gave points for participation based on class attendance but was able to use the clicker data to demonstrate to students the correlation between better exam grades and regular attendance.

Several people noted that using clickers had helped promote classroom discussions. One professor would ask opinion questions of the class. Once the results were in he would ask the students why they answered as they did and then compare classroom results to a nationwide poll on the same subject. Students who are unwilling to raise their hands to admit they don't understand a concept will use the clicker because of its anonymity.

Researchers in media are investigating audience response systems to gauge how an audience responds to media, and clickers can perform some, but not all, of the required functions.

System Cost to Student (Does not Include Retailer Markup)

PRS Interwrite:

Clicker - LCD - \$35
Clicker Non LCD - \$25
Virtual Clicker - \$20
Rebate - \$20 if book is being used

Turning Point:

Clicker - LCD - \$45
Clicker Non LCD - \$30
Virtual - \$18

lclicker:

Clicker - \$26.50

EInstruction:

Clicker LCD - \$16 + One Semester Registration - \$13 = \$29
Clicker LCD - \$16 + Lifetime Registration - \$35 = \$51

Selection of Clicker Systems for Further Evaluation

At the conclusion of each of the four demos, participants were given a survey asking them to rate the quality of vendor product demoed on a scale of 1 to 7 (7 being the highest quality) for each of the nine criteria items mentioned earlier in this report. The results of these surveys were used to help the PRS Working Group get a pulse of participant's reaction to the demo rather as an exact indicator of which product was judged to be the best. The reason for this was a significant incongruity of responses for each item due to participant's not rating every item. However, the survey responses indicated trends for how participants rated vendor products under each criteria item. As such, the PRS Group was able to get a sense of the strengths and weaknesses of each vendor product from these survey responses. See Appendix G for the PRS Working

Group's assessment of the strengths and weaknesses of each of the four clicker systems we evaluated.

After the vendor product demos, the PRS Working Group discussed the products and selected two of the four products to evaluate further by trials and mock training sessions with the vendors. Our group eliminated I>Clicker from further consideration under the rationale that while easy to use and learn, the lack of alpha-numeric input capabilities prevents the product's ability accommodate multiple uses of clicker technology.

Moreover, both Interwrite and Turning Point now offer Clicker devices with basic features that are simple to use thereby matching I>Clicker's comparative advantage. The PRS Working Group eliminated eInstruction from further consideration primarily because we found their product the most difficult to learn and use for faculty members. Secondly, the group and many faculty members who participated in this process were largely against eInstruction's pricing model whereby the majority of the cost to a student from using an eInstruction clicker lies in a registration fee rather than the clicker device itself. The group determined that eInstruction's pricing model of splitting the cost of the actual clicker device with the cost of registering a clicker for use was counterproductive to one of the primary standardization goals of establishing a market for used clickers to be sold by students to the bookstore and to other students. eInstruction receives payment by way of a registration fee every time one of their devices is resold to another student who will use it in class.

The remaining two vendors PRS Interwrite and TurningPoint Technologies were invited to provide trial kits to members of the PRS Working Group and to conduct mock training sessions so that we could get an idea of the quality of training which faculty would receive. The PRS Working Group received trial kits for the PRS Interwrite system and the Turning Point system and began experimenting with and testing the claims made by the vendors on an individual basis. Furthermore, in the mock training sessions, the PRS Working Group evaluated the learning curve of each system as well as the quality of training and support provided by the each vendor. The mock training sessions were video recorded and edited for sound and video quality so that the PRS Working Group could provide a DVD or VHS copy of the sessions for anyone on campus who would like to see them. The PRS Working Group met throughout the summer to discuss the strengths and weaknesses of each system. Appendix H provides a ranking of how each clicker we evaluated was perceived best to worst in regards to the evaluation criteria.

Recommendation of Campus Standard with Rationale

Interwrite has been selected for recommendation as the campus standard. The PRS Working Group recommends that faculty be encouraged to use the Interwrite PRS RF device as it is multi-functional Clicker. However, the PRS Working Group also recommends that faculty retain the right to chose the Interwrite Cricket device which is a scaled down, simpler Clicker which runs on the same software as the Interwrite PRS RF device. Since both devices work with the same software, both devices should be supported by OIT. However, faculty should be encouraged to use the multi-functional Interwrite PRS RF device for courses to avoid the predicament of students purchasing the

Cricket device for one course and having to later purchase the Interwrite PRS RF device for another course.

One major reason for the choice of Interwrite over Turning Point is the flexibility of Interwrite software for accommodating use with PowerPoint and use outside of PowerPoint. Another reason for the choice of Interwrite over Turning Point is the ability of Interwrite to accommodate the practice of instructors providing a loaner clicker device to students to use in the event they forget their own device. A further reason for selecting Interwrite over Turning Point is that Interwrite has considerably larger staff and resources to devote to training and supporting new and existing clicker users than does Turning Point. Beyond the reasons cited above, the PRS Working Group selected Interwrite because the cost of Interwrite Clickers to students is considerably less than the cost of Turning Point Clickers. The cost would become a non issue if Turning Point offered a clearly superior product than Interwrite. The advantages of Interwrite cited above make this a difficult case for Turning Point to make at this time.

However, the PRS Working Group strongly feels that this recommendation should be reviewed after approximately two years as the Clicker industry is tremendously competitive with upgrades to software and Clicker devices becoming available from vendors annually. The PRS Working Group based its decision on the best information available during the period of February through August of 2007. New developments in the Clicker marketplace in the years to come may change the scales for the four

companies we evaluated or new vendors may emerge offering a vastly superior product than that which the PRS Working Group has currently recommended.

Policies & Procedures for PRS Standard Adoption and Implementation

In order to put into operation a standardized preferred PRS across campus, policies and procedures for adoption and implementation should be standardized. These standardized measures should work to make the process as easy as possible for faculty and support services. To that end the Working Group recommends the following:

- 1) The University will need to announce in as many avenues as possible the selected preferred system so that faculty across campus become aware of it.
- 2) Faculty should not be prohibited from choosing a different system than the preferred system, but OIT and TLC should not be expected to fully or even partially support other products. In short, faculty who choose a different vendor than the university-preferred vendor do so at their own peril.
- 3) Any faculty interested in adopting a PRS system in their class should be strongly encouraged to complete a training session mini-course developed by the Teaching and Learning Center and the Office of Instructional Technology.
 - a) This course should instruct faculty on how to operate the hardware and software associated with the system.

- b) This course should provide useful tips and strategies for incorporating the system into the course design.
- 4) The Teaching and Learning Center and Office of Instructional Technology should spearhead an effort to design an accessible website with useful tips, frequently asked questions, and information on the vendor of the system so that faculty can research whether they think the product would be worthwhile to adopt in their classroom
- 5) Faculty should complete the TLC/OIT course the month before the semester they plan on using the system in their class.
- a) TLC/OIT will offer the mini-course in April for Summer Session use, in July for Fall Session use and in November for Spring Session use.
 - b) The course can also serve as a refresher for those who have used the system before.
 - c) It is strongly recommended that the faculty not use the system for the first time in Summer Session.
- 6) Once adopted, faculty should notify the bookstore of their decision just as they would notify them for textbook selection.

- 7) OIT Classroom Support will be the first contact point for issues that may arise in the classroom when faculty using the system encounter problems.

PRS Clicker Support Plan

Faculty currently use clickers on campus but in rather small numbers. The clickers currently in use on campus include I>clicker, PRS Interwrite and eInstruction. Given that there are multiple models of clickers, no effort to this point has been made to support any of them centrally on our campus. UNLV is currently considering standardizing on one model of clickers, and if that happens, Campus Computing Services will be able to provide some level of support for clicker use on the campus. However, given the current low level of use among early adopters, it is hard for Campus Computing to justify the dedication of significant resources in supporting them at a very high level. If adoption and use increases given the standardization and support on campus, support will be re-evaluated and perhaps additional resources will be added to support centers to provide a higher level of support for clicker adoption. Given the above parameters, a support plan for clickers use at UNLV can be found below.

Training

It is expected that each faculty member planning to adopt clickers will attend a training session prior to using them. A training session will be held about a month prior to the semester starting, and will be conducted by Campus Computing and the Teaching and Learning Center. The training session will include both pedagogy (i.e., course design) and the practical use of the technology (i.e., button clicking). Our recommendation is that faculty take this course 1 semester prior to actual adoption, giving them time to play

with the technology and redesign their course, and then retake the course one month prior to the beginning of clicker implementation.

Usage

The software and receivers will be installed on the built-in pc's on the classroom computers, however it's highly recommended that faculty purchase a laptop and connect the receiver they received in their clicker startup kit, so that the software and data don't have to be copied from computer to computer. It is possible to install the software on a USB portable drive (thumb drive), and if a laptop can't be purchased, then we'd recommend having the software installed on one of these drives.

Classroom Support

Campus Computing Services currently has student employees that provide first and second level support of technology classrooms. These students will be trained to provide basic level support of the clickers in classroom situations. The kind of support you can expect is help with basic use in regards to using the software in a classroom situation (starting a class, taking a poll, helping you get your students registered for clicker use).

The classroom support helpline is available from 8am-10pm Monday-Friday.

Faculty and Staff Helpdesk Support

The faculty and staff helpdesk will provide second level support of the software. This support line is to be used when you are having questions about clicker software/hardware while in your office. They can help with installation issues, setting up your class,

uploading and downloading information to Web Campus, synchronizing your class roster information with class lists in the clicker software, creating questions, etc.

Second level support means that the person answering the main helpdesk phone number will most likely not be able to help you immediately. They will take your contact information, and a helpdesk support person that has been trained on the clicker software will then return your call within approximately 1 business day. If this is not acceptable, you also have the option of calling the Clicker Manufacturer support center, documented below. Support hours are 8am-5pm Monday – Friday.

Clicker Manufacturer Technical Support

Another option for getting help with the clickers both in your office and in the classroom is to call the clicker support line that is run by the manufacturer. These contacts are trained specifically to support the software and hardware. The support line is open from 8am-6pm Monday – Friday.

Clicker Web Site

A website will be developed to support clicker use. This site will be a joint venture between Campus Computing Services and the Teaching and Learning Center. On the web site there will be checklists for clicker implementation, frequently asked questions, support numbers (student, faculty/staff, clicker manufacturer), training dates, as well as links to tutorials on clicker use.

Student Helpdesk Support

The clickers are very easy to use, and the registration process is as easy as typing in your L#. However, our student helpdesk will provide assistance to students that need help with the clickers. Instructors can assign homework, which could possibly be confusing. The student helpdesk is typically open 8am-9pm Monday-Friday.

Loaner Clickers

Faculty who want to provide their students the option of getting a loaner clicker (i.e., they forget their clicker, or lost it) will need to purchase additional clickers directly from the manufacturer. The clickers can easily be setup in “loaner mode” and the faculty helpdesk can assist you with that.

APPENDIX A: Timeline of Major Events

March 20th

Several members of the working group attended Ron Cronovich's presentation on the use of clickers in the classroom. Cronovich, a faculty member in the Economics Dept., has used clickers in the classroom and provided valuable information about their use.

April 10th

Word survey distributed by Chair to targeted list of current clicker users.

Announcement of April 27th Focus Group event distributed by the working group chair to targeted list of current clicker users.

Web based survey distributed by Patricia Iannuzzi via UNLV Official.

April 18th

Reminder to fill out survey and announcement of May 4th Campus Forum email distributed by Patricia Iannuzzi via UNLV Official.

Reminder to fill out survey distributed by the working group chair to targeted list of current clicker users.

April 25th

Closed both surveys and compiled results of both surveys.

April 27th

Focus Group Event for current clicker users.

Email announcement of Campus Clicker Vendor Demos for Interwrite (May 4th), I>Clicker (May 14th) and eInstruction (May 15th) distributed by Patricia Iannuzzi via UNLV Official.

May 4th

Open Campus Forum Event for everyone on campus interested in discussing clickers.

Campus Clicker Vendor Demo for Interwrite.

May 15th

Campus Clicker Vendor Demo for I>Clicker.

May 16th

Campus Clicker Vendor Demo for elnstruction.

May 17th

Email announcement of Campus Clicker Vendor Demo for TurningPoint (May 21st) distributed by Patricia Iannuzzi via UNLV Official.

May 21st

Clicker Vendor Demo for TurningPoint.

June 21st

TurningPoint Training Demo for PRS Working Group.

August 3rd

Interwrite Training Demo for PRS Working Group.

APPENDIX B: List of Clicker Systems Used on Campus

- I-clicker from VHPS

Biol 300,001
Biol 414, 001
Biol 304x, 001
Econ 103,001
Phys 152. 002

- GTCO Clicker #110068201R (PRS Interwrite)

Acc 201,001 & 002
Eng 231, 001

- Gen2 RF Pad by E Instruction (eInstruction)

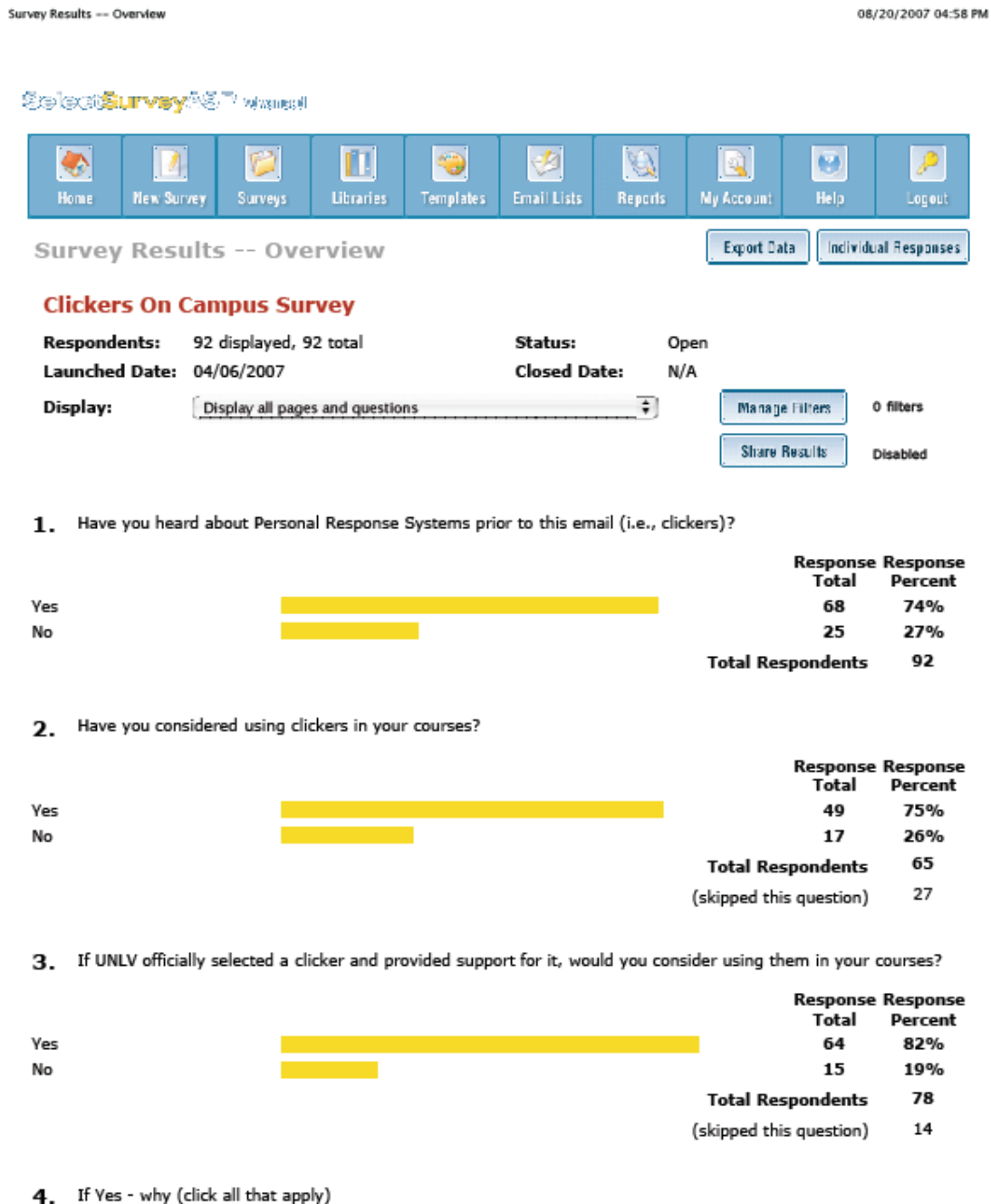
Com 102, 001-005 & 009
Psy 240, 004 & 005

APPENDIX C: PRS (Clicker) Survey for Current Users

1. What personal response system do you currently use?
2. What do you consider the most important criteria in selecting a personal response clicker for use in class?
3. What do you use clickers for in your class, and how effective are they?
4. How were you trained to use the clicker system you adopted and what would you like to see the university and/or manufacturer do to assist in the training process?
5. What support network is in place for your current system? Please describe it and explain whether or not you are satisfied and why. In what way could the campus assist in support?



















APPENDIX D: Results of Web Based Survey

Right click mouse somewhere on the picture below and select **Adobe Document Object** then **Open** to view the entire survey.



APPENDIX E: Ranked List of Criteria for Deciding on PRS Standard

6. There are many clicker systems available with many different capabilities, what do you consider the most important criteria in selecting a personal response system (aka, clicker) for use in class (please select your top five choices)

		Response Total	Response Percent
Cost to the student		48	67%
Ease of use by students (clicker hardware)		37	51%
Ease of use by faculty (clicker hardware and software)		45	62%
Input capabilities of the keypad (e.g., "A-E" or "A-J", student comments, etc.)		20	28%
Accessibility to the impaired (e.g., braille keypad buttons)		6	8%
Textbook publisher popularity (i.e, how many publishers bundle a particular clicker with their textbooks)		4	6%
Reliability (software)		32	44%
Reliability (hardware)		25	35%
Manufacturer technical support		12	17%
Ease of student clicker registration process		19	26%
Clicker Size		7	10%
Availability of bundled resources (online help, test banks, etc)		3	4%
Ease of integration with Powerpoint		22	31%
Ease of integration with CMS (i.e, Web CT, Web Campus, Blackboard)		21	29%
Software available on many platforms (Windows, Mac, Linux, etc)		11	15%
Consistency with other Nevada Educational Institutions		4	6%
Popularity with other higher educational institutions nationwide		1	1%
Other, please specify view		13	18%
		Total Respondents	72
		(skipped this question)	20

APPENDIX F: Faculty Teaching and Learning Objectives

The Working Group surveyed instructors who currently employ some form of PRS in their classes and ten responded. The following teaching and learning objectives appear to be the most important for those who use PRS systems in class:

- 1) To encourage students to read the material and assess whether or not they have done so.
- 2) To take and record attendance.
- 3) To assess comprehension during lectures through the use of polling features.
- 4) To facilitate interaction between students and between the students and the instructor.

To encourage students to have their attitudes and opinions reflected anonymously in class with the outcome of facilitating discussions about such opinions and attitudes appropriate to the learning content of the course.

To encourage students to defend and justify an answer to a question in a group with the outcome of arriving at a group consensus.

- 5) To reinforce key concepts in class.
- 6) To administer quizzes and exams.
- 7) To have students complete short homework assignments out of class to reinforce material students read.
- 8) To enable instructors to adapt their lectures “on the fly” based on student responses.
- 9) To renew student focus when attention seems to be drifting.
- 10) To have students and or researchers measure reactions to visual media in real time such as commercials or political debates to analyze effectiveness of the media product.

APPENDIX G: Clicker Models Strengths and Weaknesses

PRS Interwrite

Strengths:

- Easy to use
- Can use both inside and outside of ppt with their software
- Very easy to provide loner clickers
- Cost is relatively low based on a clicker with many features
- Registration of clickers is easy for students and faculty
- Powerpoint Integration
- Feature Rich
- Each faculty member that adopts gets startup kit
- Has virtual clicker
- Very large company with large R and D and support

Weaknesses:

- Clicker is a little bulky
- No Web CT integration (powerlink)

Turning Point

Strengths:

- Easy to use - very easy to get started and is creates the most attractive slides
- Well integrated into powerpoint
- Web CT Integration (makes registration process pretty painless)
- Feature rich
- Has virtual clicker
- Large Company

Weaknesses:

- No gradebook
- No loaner option
- Most expensive clicker
- Haven't seen new LCD based clicker (brand new product that isn't available for testing yet)
- Registration of clickers (if not using WEB CT) is difficult
- Faculty must use PPT to create clicker questions, or have to use a different piece of software (don't want to have to support two different products)

I>Clicker

Strengths:

- Easy to use
- Cheap

Weaknesses:

- Not integrated into ppt
- Very little features
- No text or number input
- Small company that hasn't been around for very long (just started 1 year ago)
- Big bulky clicker and receiver

Einstruction**Strengths:**

- Web CT integration
- Large Company

Weaknesses:

- Most difficult product to use
- Registration fees for our students
- Credit card transactions for our students, and on-line database where they have to register
- Can't use without registering clicker (can't easily use for training sessions, seminars, etc)

Appendix H: Clicker Product Evaluation Matrix

This is our group's ranking of the performance of each product under each criteria category from 1 (best product) to 4 (worst product).

Cost to the student	1- Iclicker 2- Prs Interwrite 3- Einstruction 4- Turning Point
Ease of use by faculty (clicker hardware and software)	1- Iclicker 2- Turning Point 3- Prs Interwrite 4- Einstruction
Ease of use by students (clicker hardware)	1- Iclicker 2- Turning Point 3- PRS Interwrite 4- Einstruction
Reliability (software)	1- PRS Interwrite 2- Turning Point 3- Einstruction 4- Iclicker
Reliability (hardware)	1- PRS Interwrite 2- Turning Point 3- Einstructon 4- Iclicker
Ease of integration with Powerpoint	1- Turning Point 2- PRS Interwrite 3- Einstruction 4- Iclicker
Ease of integration with CMS (i.e, Web CT, Web Campus, Blackboard)	1- Turning Point 2- Einstruction 3- PRS Interwrite 4- Iclicker
Input capabilities of the keypad (e.g., "A-E" or "A-J", student comments, etc.)	1- PRS Interwrite 2- Turning Point 3- Einstruction 4- Iclicker
Ease of student clicker registration process	1- PRS Interwrite 2- Iclicker 3- Turning Point 4- Einstruction

Total Points (least is best):

PRS Interwrite: 17 Turning Point: 19 I>clicker: 25 eInstruction: 30