SCAMeL Speedy Startup 2021

Supporting Research, Interprofessional Team Projects and STEM Outreach by providing Free 3D Printing to Students. A System-Wide Project for a Multi-Campus Health Sciences Library

C. Erik Wilkinson, MLS | Texas Tech University Health Sciences Center – Libraries of the Health Sciences

RE REQUIRED REPORT:

Final Team Roster:

- Gary Ventolini, M.D. | Principal Investigator, Odessa
- C. Erik Wilkinson, MLS | Project Manager, Odessa
- Kate M. Serralde, MA | Project Manager, Lubbock
- Jaime Diaz, BS | Project Assistant, Lubbock

Why did you want to do the project? – We saw an opportunity to expand system-wide 3D print services, believing that if we removed the cost barrier, we would attract more interest from library patrons.

What did you do?

- The fund was divided into 4 different areas:
  - First a twenty-dollar credit towards a choice of any kind of 3D print. This component involved the 3D print store and a promotional code.
  - The second component funded inter-professional research, which allocated funds to cover the cost of materials.
  - The third component funded student research in 3D printing.
  - The final component was an outreach program that turns on the purchase of a 3D printer kit and filament. Our goal for the Assembl3D program is to share the wealth of our experiences and disseminate the benefits of 3D printing by supporting the development of maker spaces within a local K-12 library program.
- Marketing involved videos, social media, and intra-campus promotion using digital marketing on campus screens and announcements page.
- Processed orders in a timely fashion.
- Accommodated every request and ordered specialty materials when requested.

Who was involved? – An inter-campus team, working independently, with an independent PI.

Was the budget accurate?

Yes. We purchased ~$2,577 amount of supplies, and out of that, produced 700+ objects; worked with over 200+ members of the TTUHSC community, managed four research teams, and established an outreach 3D printing program with a local K-12 school library.

In terms of research, student and inter-professional research applications were expected to explore the purpose of 3D printing within healthcare practices and education. The SCAMeL award was used to cover the cost of materials. In our initial application, we allocated $500 for inter-professional and $1500 for student research. All funded research was expected to result in scholarly activity and include a 3D printed production element made on the 3D printing equipment in the Methodology Lab. Application guidelines stated that all design work was to be completed by project members or affiliates, however, some mentoring and design assistance was provided by library staff.

In reality, the management of these projects proved to be a challenge because due to a lack of understanding of 3D printing technology. While the inter-professional research team had experience with 3D modeling, student teams were sorely lacking the skill sets to actualize their ideas and meet their research aspirations. As such, each project was assigned a project manager and design consultant from our team to oversee the progress of their research. In the case of the student research teams I and III, these researchers demonstrated a vested interest in the research, however, student research II,

failed to meet basic criteria like maintaining effective communication by responding to our request for project updates and attempts to acquire the correct file types for 3D printing their models. Building off their lackluster response, we counter-balanced other teams with more direct oversight. As such, we have learned that providing highly structured guidelines is an effective way to balance fledgling interest with the reality of 3D printing. That is to say, guidelines instilled with a skill-building contingency to ensure that 3D printer researchers have the skills to actualize their ideas.

In terms of funding, we learned that the calculation of 3D printing material requires broad tolerances. While the inter-professional I was awarded $350, our project manager and design consultant found it necessary to increase the funding for materials, because of inflation and to compensate for prototyping. In contrast, the student research team II was awarded $350 for materials, but in reality, only utilized a single spool of filament, as the team lacked initiative. Nonetheless, we were are planning to offer more student-led research opportunities in the coming year.

Inter-Professional I: Improving Biomedical Research with 3D Printed Materials

Team Leads: Dr. Pablo Artigas, Daniel Self, and Kerri Spontarelli

Project Summary:
Underlying all of healthcare is the knowledge and insight gained from biomedical research. However, to continue to improve and innovate biomedical research, we must alleviate the frequent burden by both the price as well as the functionality of many basic laboratory materials. This project will have 2 main aims: 1) To improve the functionality, price, and efficiency of our biomedical research lab materials. 2) To educate and inspire creativity in our undergraduate and graduate research students. Our lab uses a large variety of techniques to study the protein called the Na+, K+ ATPases to better understand the function of the Na+, K+ ATPase function in normal physiology as well as disease states that are associated with Primary Aldosteronism and Charcot Marie Tooth disease. We use molecular biology, biochemistry, electrophysiology and animal models to further our understanding of this protein. As such, we are posed to implement 3D printed materials into a large variety of biomedical research settings to improve both the function and costs. Techniques such as electrophysiology require very specialized parts, some of which cannot be purchased and must be made by hand. Being able to rapidly prototype and then reliably 3D print these parts saves both time and experimental reproducibility. Other parts that we use in the lab, maybe more common, but the price, due to the inflation of scientific supplies, it out of our budget. For instance, the trays we use to case gels for electrophoresis are on the price point of $100s of dollars when they are only made of ~10 mL of plastic. Our lab is made up of several graduate and undergraduate students from biological sciences background. Outside of an engineering background, exposure to 3D printing is limited. Therefore, this project serves a useful role in allowing them to learn about the methods behind 3D printing while also having a direct drive to manufacture a useful product i.e. goal-oriented learning.

Interprofessional I	Material	QTY	Cost	Total	Net Material Allocation
	FL Clear Resin	1	$149.00	$149.00	$350.00
	FL Durable Resin	1	$199.00	$199.00	
	FL Resin Tan k	2	$149.99	$299.98	
	FL Shipping	1	$16.31	$16.31	
				$664.29	

Inter-Professional II: Training Gynecology Residents in Pelvic Prolapse Disorders and Surgical Simulation Using 3D Printed Pelvic Models

Team Leads: Elisa Brown, MD, C. Erik Wilkinson, MLS, Kate Serralde, MA, Jaime Diaz, Nolan Shelton

Project Summary:
The TTUHSC 3D printing service was instrumental in putting together a very successful gynecologic simulation on diagnosis and repair of pelvic organ prolapse, 27 February 2023, on the Permian Basin campus. The 3 hour anatomic and surgical simulation used 3D pelvic models to teach TTUHSC OB-GYN residents normal pelvic anatomy and the abnormal anatomy of pelvic prolapse. Attachments to the 3D models were used not only to simulate pelvic prolapse and teach the atomic spatial relationships in prolapse disorders. The pelvic models with removable attachments were also used to simulate repair of pelvic prolapse disorders including appropriate procedures for suspension of vaginal prolapse defects, suturing techniques, and avoiding complications. The simulation exercise was greatly enhanced by using the 3D models as a foundation for didactic and surgical instruction. Residents polled noted the course and models to be educationally useful.

Interprofessional II	Material	QTY	Cost	Total	Net Material Allocation
	White PLA (spool)	1	$18.99	$18.99	$13.30
				$18.99	

Student Research I: 3D Eye Suture Model for Training in Ophthalmology
Team Leads: Irina Kim Cavdar, Vanessa Davis, and Nolan Shelton

Faculty Advisor: Kelly Mitchell, MD, Jaime Diaz, and Kate Serralde, MA

Project Summary:
This student lead research project aimed to utilize 3D printing to create a more efficient 3D eye suture model AND to analyze a new 3D eye suture model designed to facilitate training for ophthalmology residents and propose improvements for the current model (see abstract in appendixes).

Project	Material	QTY	Cost	Total
Eye Student Research I	Black PLA	1	$18.99	$18.99
	FL Elastic Resin	1	$199.00	$199.00
	FL Resin Tank	1	$149.00	$149.00
	FL Shipping	1	$15.21	$15.21
	White PLA	1	$18.99	$18.99
	Silicone	0.5	$21.83	$10.92
	NOva3d High Transparent Resin	1	47.19	$47.19
				$459.30

Student Research II: Exploratory 3D Printing Learning Models in Neuro-Anatomy
Team Leads: Ryan Morgan, Luis Castro

Faculty Advisor: Benjamin Baronia, MD

Project Summary:
To supplement a better understanding of neuroanatomy, this project explored the effectiveness of mobile phone 3D scanning apps to create a 3D model of a fiber-tract dissection of the left and right hemispheres of a human brain.

Student Research II	Material	QTY	Cost	Total	Material Allocation
Neuro Anatomy Education	White PLA	1	18.99	18.99	$350.00
Total Material Allocation: 1000 grams				18.99	

Student Research III: 3D Neonatal Heart Congenital Heart Models
Team Leads: Vishal Bandaru MS, Robert Meeks MBA, Rohan Pendse BS, Douglas Bettarelli BS, Coltyn Wagnon BS, Vivie Tran BS

Faculty Advisor: Kate Serralde MA, Alikbar Arvandi MD, Mohammad Ansari MD, Melissa Piepkorn MD (PI)

Project Summary:
This student lead research project explores different ways to recreate neo-natal anatomy from volumetric medical imaging data extracted from echocardiograms and computed tomography. Students hope that results will offer a feasible alternative to looking at anatomical structures in the long-term for fetal development, allow cardiologists to determine the best paths for surgery, influence patient education, and enhance medical education.

Student Research III	Material	QTY	Cost	Total	Material Allocation
3D Printing Heart Models	Black PLA	1	$18.99	$18.99	
	Clear PLA	1	$23.99	$23.99	
	Red PLA	1	$23.99	$23.99	
	White PLA	1	$18.99	$18.99	
	Silicone	0.5	$21.83	$10.92	
Material. Allocation: 4000 gram of PLA, 10.59 ml of Silicon				$96.88	

In terms of outreach, we allocated $500.00 towards the purchase of one Creality Ender 5 Pro 3D Printer kit and two spools of filament. Through a twelve-week mentoring session, a Lubbock-area library will learn from our experience. The awarded library, Terra Vista Middle School, Frenship ISD, will be guided in the assembly and operation of a Creality printer while learning 3D printing fundamentals through a humanities-based curriculum designed to provide 3D modeling skills with medical imaging and geometric primitives. At the end of the mentorship, with the demonstration of mastery, the 3D printer will be donated to the library to start a 3D program within their school.

The approved application was accepted from Terra Vista Middle School, Frenship ISD. The awarded program was notified on March 24, 2023. The award included one Creality Ender 5 Pro 3D Printer kit and two spools of filament. The awarded library will provide an approval letter from their school district administrator with permission to accept the 3D Printer and filament, as well as approval for the offsite training. The awarded library staff member is expected to attend all training sessions as

outlined in the syllabus, as well as demonstrate sufficient mastery based on project objectives, and present a 3D printing lesson plan geared for a K-12 environment.

- **Was the time sufficient to carry out the plan?**
    - Yes. The project was conducted in four phases. Phase 1 involved the development of a survey and marketing prep. In April 2022, a survey was prepared, then at the start of phase 2, the survey was disseminated from May 2022 to September 2022. During phase 2, the bulk of our consumable materials like filament for 3D printing was ordered, as well as, the development of an online 3D print store which allowed for the use of a promotional credit of twenty dollars towards a 3D printing of choice. Phase 3[1] began on September 6, 2022, when the twenty-dollar promotional credit was available for the TTUHSC community. At this same time, marketing materials were distributed on social media and the university's announcement page to promote the $20 promo credit, along with, application deadlines for interprofessional and student research. Research applications were due on October 1, 2022, and awarded projects were announced on Oct 15, 2022. During the last phase, the outreach portion of our funding was announced on social media. The SCAMeL Assembl3d project requested applications from K-12 libraries in the Lubbock area interested in starting a 3D printing program. Applications for Assembl3D were due on March 15, 2023, and the awarded library was announced on March 21, 2023. The outreach program will begin on June 6, 2023, and extend over a twelve-week period, during this time the awarded library will work with our 3D printing staff to build and learn how to use a 3D printer which will be donated to their school at the end of the training session.

- **Were expected outcomes met?**

    - Yes. The SCAMeL funding award was divided into four categories: $20 Promotional Credit, Student Research, Interprofessional Research, and Outreach. To demonstrate 3D printing's versatility, a twenty-dollar promotional credit was made available to TTUHSC students, staff, and faculty for a 3D print of personal choice. To validate the function and purpose of 3D printing, we allocated funds to support student and inter-professional research on 3D printing and health care. Finally, to disseminate the benefits of 3D printing in educational settings like the Fine Arts and STEM professions, we will be offering access to learning more about implementing a 3D printing program.

      To gain more information about the TTUHSC community's current medicine-centric attitudes and familiarity with 3D printing applications, an intercampus survey was disseminated before award funds were made available.

      From April 28, 2022, to September 26, 2022, a survey was distributed through a variety of ways such as email, marketing materials imbued with QR codes, and a university announcement page. Over that time, 86 responses were received. Survey results stressed a preference for structured learning opportunities (Q1, 40.63%), as well as, a strong belief that 3D printing will be a relevant tool in future medical practices (Q8, 88.14%). While learning preferences varied from an interest in learning basic skills to doctorate-level instruction, 73.02% of participants expressed interest in access to learning opportunities encompassing 3D printing and regenerative medicine. Regarding preferences over types of design services, 72.58% of participants expressed an interest in gaining more information on services for developing medical simulation tools for suturing and other surgical practices. In addition, 90.32% of participants surveyed indicated that financial costs were a barrier or impediment to utilizing current 3D printing services. (Q4: If material costs for 3D printing were free would you use it?) In terms of best marketing practices or preferences to types of access of 3D printing information, most participants indicated that face-to-face (29.51%) and email (29.51%) were strongly preferred over video chat (13.11%), online videos or slide shows (4.92%), while the gathering information from the website or social media would also suffice (22.95%). Finally, when participants were asked about what types of 3D printing equipment ought to be provided in a maker space, 17.07% of participants expressed interest in bio-printing equipment, while 18.70% of participants showed a preference for developing a virtual reality learning space. In addition, 6.5% of participants expressed interest in medical and legal uses of 3D printing for neuroimaging and

[1] Phase 3 is still live until all SCAM3L material has been used.

legal cases and 16.26% of responses expressed interest in equipment for research and manufacturing support. (Q7)

To demonstrate 3D printing's versatility, a twenty-dollar promotional credit was made available to TTUHSC students, staff, and faculty for a 3D print of personal choice. From September 6, 2022, 196 requests were placed using the promo code "TAKE20_3D." The promotional credit was made available on our Lubbock, Amarillo, and Odessa campuses, as well as all TTUHSC satellite locations and distance education students. Shipping was provided to our Dallas and Abilene locations, while main campus requests were picked up by patrons at their local libraries. Out of the 196 requests, 68% were walk-in requests picked up at the local campus library, 19% of promo requests were dropped off at on-campus locations, and 14% of our requests were shipped. The twenty-dollar credit was applied to products listed within the SCAMEL 3D Printing Shoppe (92%) or special requests like models from online design communities and special design requests (8%). The types of 3D print store requests ranged from packages available in our 3D print store. Patrons could customize their package based on product, size, and color. For example, 59% of our promo credits selected products from our Curiosity Combo which allowed patrons to choose from university paraphilia, keychains, suture pad kits, and pen sets. The Anatomy, Reformulating the Phalanges, and Cardio Packages represented 28% of the total requests from the 3D print store products.

In total 714 objects were printed using about 20,345 grams of filament and 1,187 milliliters of silicone. 321 objects were medically related, of which 223 were anatomical models. For example, 48 representations of the skull were printed, 47 types of hearts were requested, and 51 brain models. In total, 40 Suture pads Kits, which included a case with a lid and replaceable silicone pad, were offered in customizable sizes and colors for $20, $10, and $5 sizes in iridescent, blue, copper, and purple. In addition, some of our medically related objects were reformulations of anatomy like the products offered in our Reformulation of the Phalanges SCAMeL package which offered a novel way to use a skeletal model of a human hand as a coaster holder for heart and brain coasters, jewelry holder, or pen. Of the non-medically related products, pens (63%) and university paraphilia (15%) were in the highest demand. Keychains, which were also reformulations of human anatomy amounted to 58 printed objects in colors like clear, black, red, and rainbow. Seasonal products were offered as limited-edition products. We produced original designs for 3D models (48 objects) to celebrate holidays like Dia De Los Muertos with custom-painted skull plaques in $5, $10, $20 sizes and 3D relief style 'papel picado' coasters, as well as, autumn and winter themed designs.

To validate the function and purpose of 3D printing, we allocated funds to support student and inter-professional research on 3D printing and health care. In total, we funded five projects with about five to ten team members. In addition, the guidance from library staff, for all research teams, including student-led, a medical practitioner or faculty advisor supported the research. Projects ranged from producing customized microscope equipment to medical simulation training devices. The average allocation for a project was about $273.17, while the actual average material usage for each project was about $251.69. The materials allocated were comprised of 3D printing materials like resin for stereolithography 3D printers and filament for fused filament fabrication printers. In addition, silicone was also purchased to support medical simulation projects.

Finally, to disseminate the benefits of 3D printing in educational settings like the Fine Arts and STEM professions, we purchased a 3D printer kit and have scheduled a mentoring program that will begin in June 2023. An update on the progress of the component can be provided upon completion.

- **What worked well?**
  - 3D print store worked well, especially the discount code.
  - 3D print store allowed project to efficiently and equally allocate funds to the greatest number of users.
  - The 3D print store ensured diversity of requested projects and exposed patrons to the benefits of 3D printing by demonstrating customization through model size and color.
  - Pre-made combos allowed patrons to easily select items upfront, and streamlined work processes at the point of production (printing on demand).
  - When we built in training and measurable benchmarks we had better outcomes.
  - Participants who were actively engaged throughout the entire process.
  - Specifically allocating materials for certain kinds of use, i.e, research, "3D Print Promo Code", IPE, and outreach.

Would you have done anything differently?

- Material orders ought to be separated by project.
- Research projects required more time than we originally anticipated, i.e.:
  - Shipping delays from suppliers.
  - Order errors.
  - Better overall communication.
  - Highly structured guidelines.
- Build in shipping costs to budget.
- Pre-approved partnerships, for example with TTU's engineering department.
- More staff (student assistants doing more of the busy work).
- Did not estimate enough time for projects.
- Found that participants needed more time for skill-building.
- Filter out research applicants unwilling to dedicate time and effort to project.
- Allocated more funds for outreach projects.
- Allocating more funding for shipping to accommodate multi-campus system.
- Designated team member for managing award-related expenditures and daily admin.
- Due to demands on time, designated marketing person.

- **Anything else to share?**
  - We had originally planned on more involvement by marketing team member; however, they left and have not been replaced.

APPENDIXES

(starts next page)

EXAMPLE ABSTRACT:

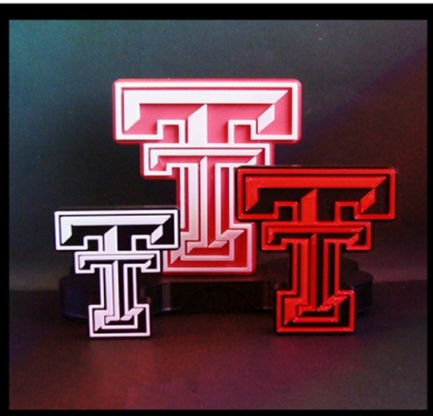
Ophthalmic Suture Kit

There are many eye models on the market designed to help ophthalmology students learn how to suture. Most of these models, however, have major disadvantages including high costs, long delivery times, unrealistic anatomy (for example, they offer only eyes without surrounding structures such as nose or eye socket). In this project, our goal was to develop a novel 3D printed ophthalmic suture model that would address these issues; (1) We based the design of this model on real human eye anatomy. This allows the students to experience suturing more closely to what it would feel like in the operating room where the surgeons are limited by the field of operation and have to pay attention to neighboring structures. The versatility of the model allows the students to take the challenge one step at a time. So, the student can start from suturing on a highly prompted eye (minimizing distractions due to surrounding structures) then gradually progress to more realistic settings. (2) To address the issue with long deliveries (sometimes stretching up to a month) and prohibiting costs of currently available commercial options, we utilized 3D printing technique that allows on site kit assembly ready for use within minutes.

So far, with the help from previous grants, we have developed a skull and several eye models (that vary by design, type of filling and liquid used to mimic the aqueous humor, the fluid in the eye). We then chose and optimized one eye model. Currently we are ready to print multiple copies and to try this optimized model on ophthalmology residents. For future perspective, our immediate goal is to keep searching for material (3D filament) for optimal feel and transparency of the cornea, and our long term goal is to look into ways to further lower the cost of the model and offer more options (such as a portable suture kit) for ophthalmology students.

Document	Doc Ref	Trans Descrip	Act Date	Trans Date	Account	Amount	Notes	Award Allocation
KP023775	31110	Tabe Tents flat & posters	06-13-2022	06-01-2022	727300	49.30	100 Table Tent , 100 Poster	ADVERTISING
CH013339	27404084	0719Bagwel-Amazon.com G78SH2GA3	07-26-2022	07-26-2022	730050	17.67	144 BIC Round Stic Xtra-life Pens	Kitchen Sink Printing (Promo code)
CH013339	27404084	0718Bagwel-AMZN Mktp US JN7U33DG3	07-26-2022	07-26-2022	730050	10.92	Super Glue	Kitchen Sink Printing (Promo code)
CH014779	27893985	0823Raybon-AMZN Mktp US B355B0TL3	09-06-2022	08-31-2022	730900	2,577.90	110 ct Filament Various Colors)	Kitchen Sink Printing (Promo code)
V8261622		Summus Staples	09-16-2022	09-15-2022	730050	31.96	240 ct BIC Round Stic Xtra-life Pens	Kitchen Sink Printing (Promo code)
V8261674		Summus Staples	09-20-2022	09-15-2022	730050	135.09	Mailing Materials & Shopping bags	Kitchen Sink Printing (Promo code)
KM003525	HMS39052	Postage September 2022	10-04-2022	09-30-2022	729100	5.30	Shipping Costs	Postage
CH015309	28309735	0923Raybon-AMZN Mktp US 1M40K49P2	10-04-2022	10-04-2022	730000	85.47	silicone 3 packs/ Aqua Tissue Paper (2)	
KM003540	HMS39054	Postage - October 2022	11-08-2022	10-31-2022	729100	101.79	Postage	Postage
V8281287		Mavich Grainger	11-02-2022	11-01-2022	730050	28.00	Shipping Boxes 8in / Shipping Boxes 10 in (50)	
CH016627	28990162	1107Raybon-AMZN Mktp US H282Z1BR1	11-17-2022	11-17-2022	730000	164.91	Heat Gun, 3 silicone, Clear Gloss, Filament, sanding sponge, sanding twgs, clear shopping bags	Special Order
KM003549	HMS39056	Postage - November 2022	12-07-2022	11-30-2022	729100	35.35	Postage	Postage
CH017057	29183033	1121Raybon-AMZN Mktp US HI63P10R2	12-06-2022	12-06-2022	730000	91.96	4 Filaments (Holiday, Special Order)	
KM003560	HMS39058	Postage - December 2022	01-06-2023	12-31-2022	729100	18.70	Postage	Postage
CH017809	29501949	1215Raybon-AMZN MKTP US RG08Y9FZ3	01-02-2023	01-02-2023	730000	536.13	Printer Kit and Filament	Outreach
CH017809	29501949	1215Raybon-AMZN MKTP US XN3CE8OU3	01-02-2023	01-02-2023	730000	42.99	Filament	Outreach
V8309469		Formlabs Inc	01-13-2023	01-13-2023	730050	(646.00)	Clear Resin Cartridge, Durable Resin Cartridge, 2 2 form 3 Resin Tank v2.1	
V8309469		Formlabs Inc	01-13-2023	01-13-2023	730050	1,292.00	EYE/Artigas ?	
V8309469		Formlabs Inc	01-13-2023	01-13-2023	728600	(16.31)	Shipping and Handling	Shipping and Handling
V8309469		Formlabs Inc	01-13-2023	01-13-2023	728600	32.62	?	Shipping and Handling
V8312069		Formlabs Inc	01-19-2023	01-19-2023	730050	348.00	Elastic Resin Cartridge, Form 3 Resin Tank V2.1	
V8312069		Formlabs Inc	01-19-2023	01-19-2023	728603	15.21	Shipping and Handling	Shipping Costs
							Brain Project	
							Heart Research (3 x Filament)	
KM003587	HMS34043	FEDEX 617912006351 20230222	03-07-2023	03-07-2023	728600	10.89		Shipping Costs
Overall						**4,969.85**		


Total Number of Pens, 246


Double T, 88


Brain, 51

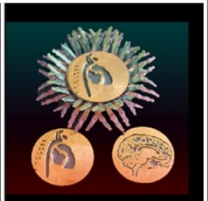

Coasters


Skulls, 48



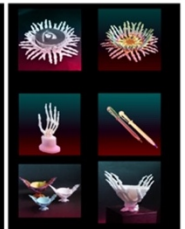
Pens Sets, 54


Winter Iconography, 32

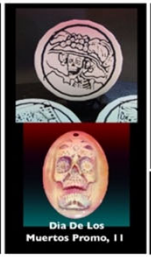

Brain and Heart Coasters, 17


Heart Models, 47


Spine Keychain, 34


Phalanges Reformulation,


Whole Heart, 18


Dia De Los Muertos Promo, 11


Conjoining Heart, 5


Iconographies of Fall, 5

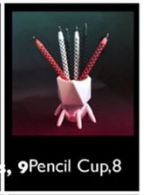

Phalanges Pen, 4


Parasternal Heart, 2


Suture Kits, 40

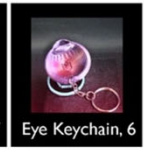

Skeleton: Hand Bones, 1


Coaster Holders, 9

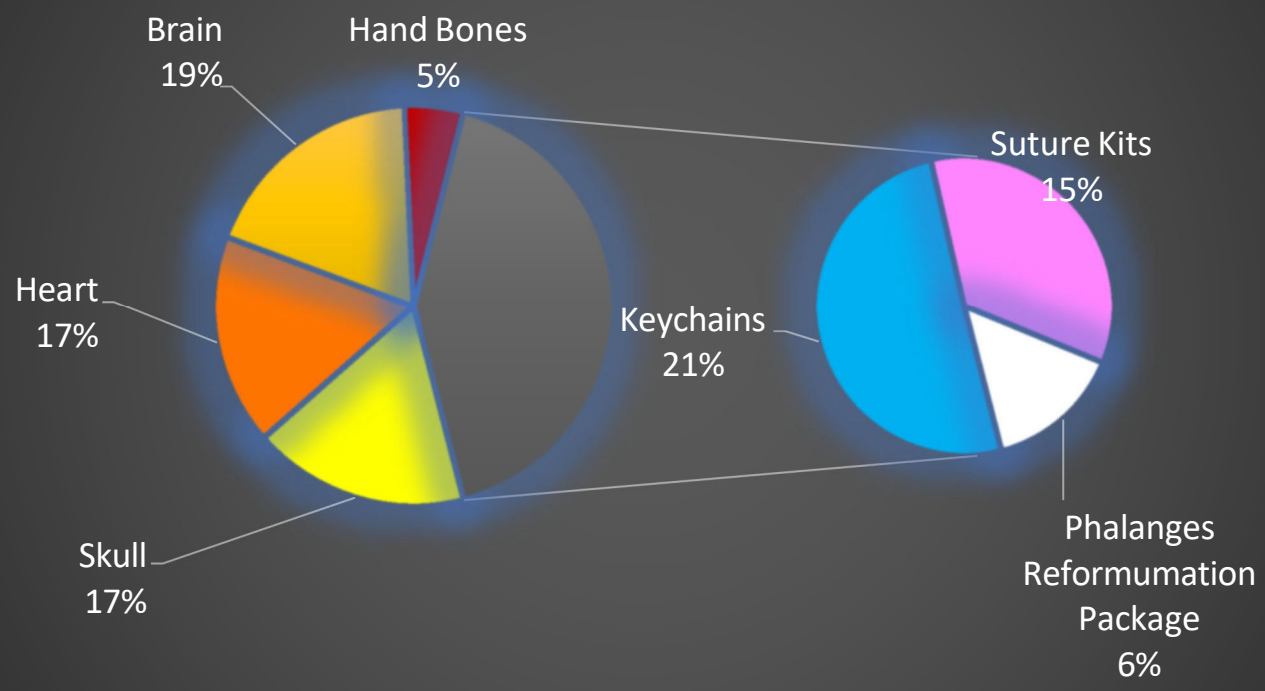

Pencil Cup,8

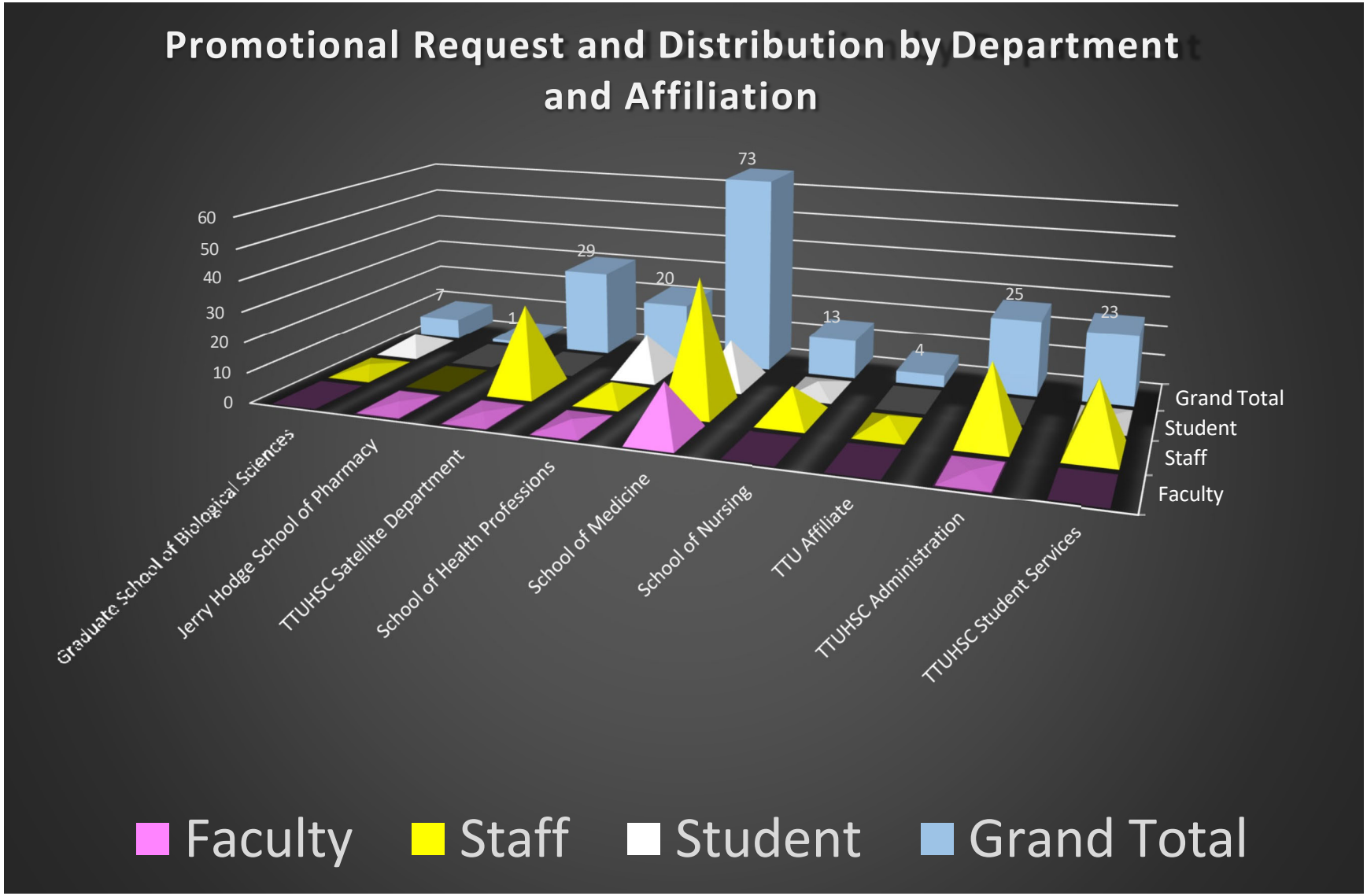

Skull with Removable Brain 1

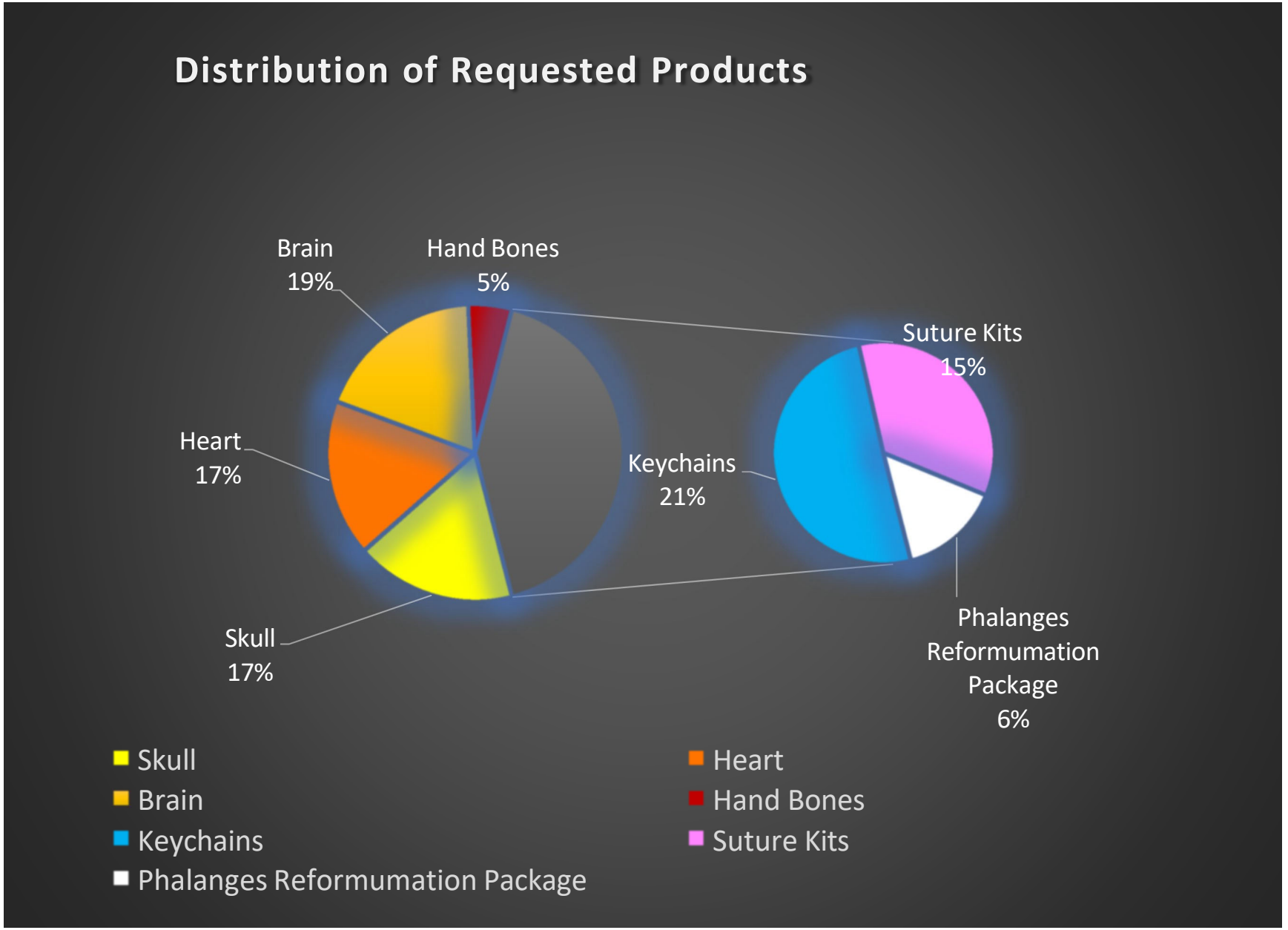

Rib Keychain, 7

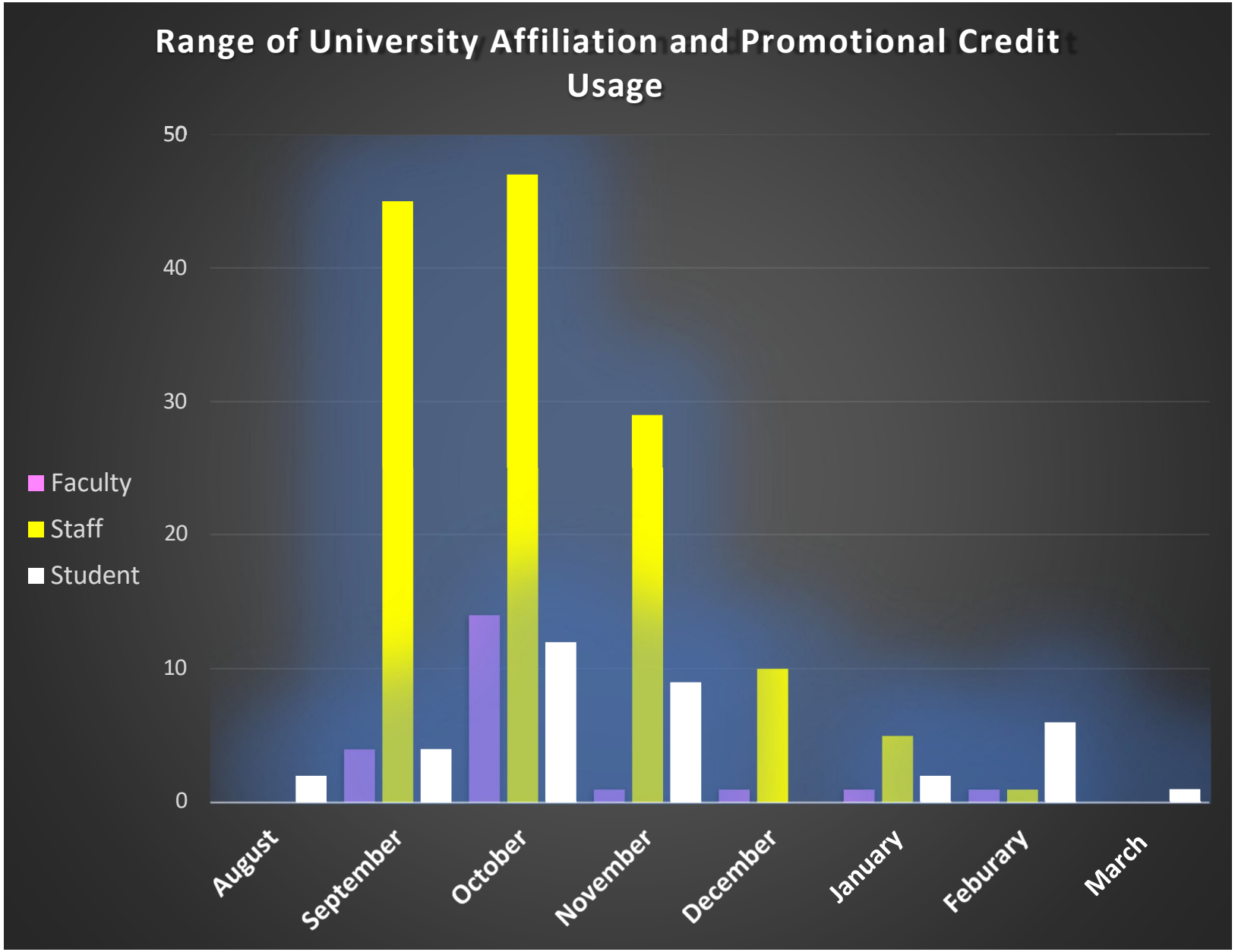

Eye Keychain, 6

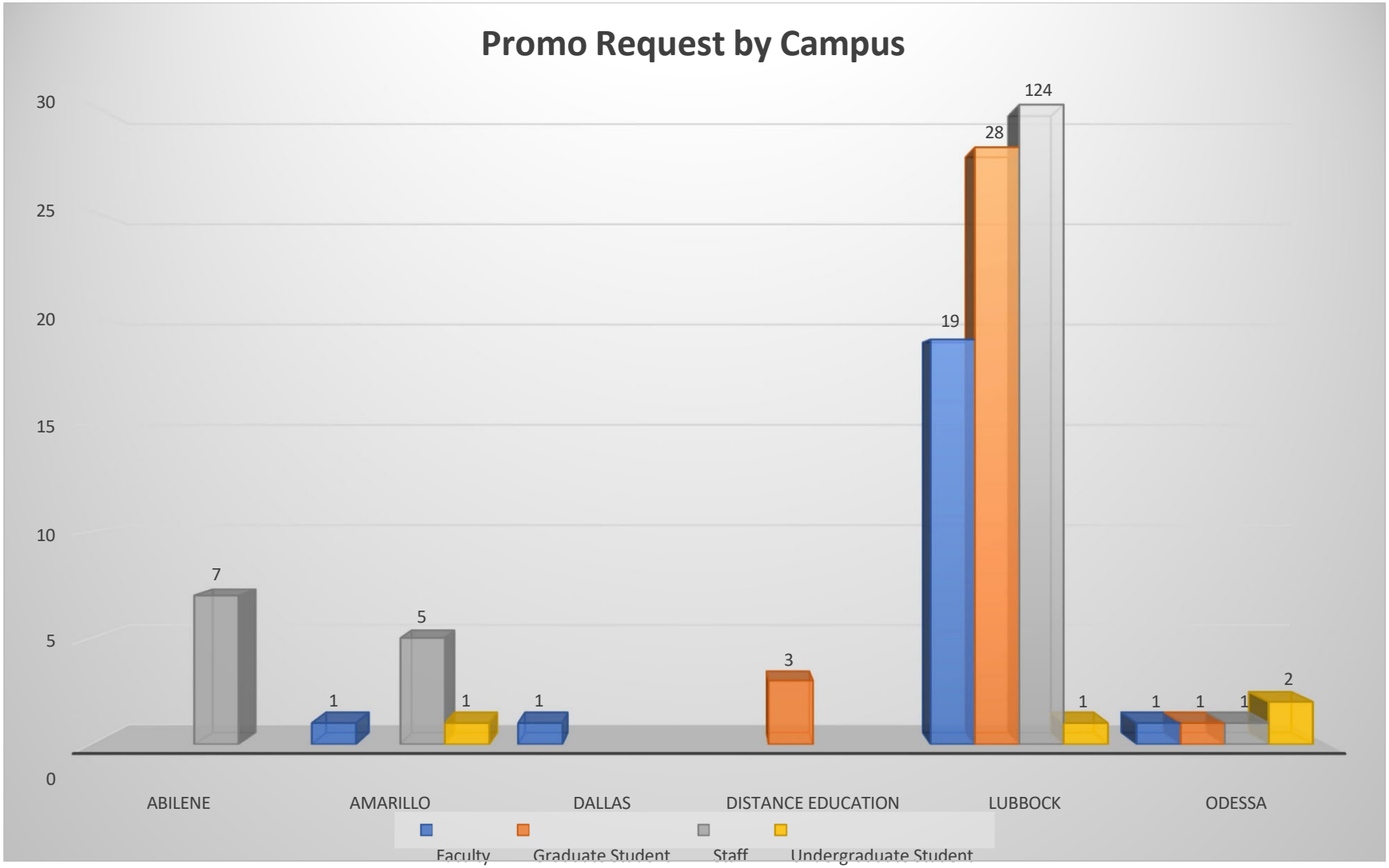
Distribution of Requested Products




Promotional Request and Distribution by Department and Affiliation
60
50
40
30
20
10
0
7
1
29
20
73
13
4
25
23
Graduate School of Biological Sciences
Jerry Hodge School of Pharmacy
TTUHSC Satellite Department
School of Health Professions
School of Medicine
School of Nursing
TTU Affiliate
TTUHSC Administration
TTUHSC Student Services
Grand Total
Student
Staff
Faculty
Faculty
Staff
Student
Grand Total


Distribution of Requested Products
Brain
19%
Hand Bones
5%
Suture Kits
15%
Heart
17%
Keychains
21%
Skull
17%
Phalanges
Reformumation
Package
6%
Skull
Heart
Brain
Hand Bones
Keychains
Suture Kits
Phalanges Reformumation Package


Range of University Affiliation and Promotional Credit Usage
50
40
30
20
10
0
Faculty
Staff
Student
August
September
October
November
December
January
Feburary
March


Promo Request by Campus
30
25
20
15
10
5
0
7
1
5
1
1
3
19
28
124
1
1
1
1
2
ABILENE
AMARILLO
DALLAS
DISTANCE EDUCATION
LUBBOCK
ODESSA
Faculty
Graduate Student
Staff
Undergraduate Student