

## **Prescribing the NAR**

### **1. Introduction**

If one said “NAR” to any active Botball student, they would most likely know what the acronym stands for - Norman Advanced Robotics. 17 years ago, David Miller, among others, had the brilliant idea to create Botball; a thriving, competitive organization that has given middle and high school students the chance to design, build, program, and then later compete autonomous robots. David Askey, a distinguished physics teacher at Norman High School, saw the opportunity and founded a Norman Botball team 14 years ago. The team quickly became a success. There are several factors that contribute to the notable reputation of the NAR: an active sponsor, Mr. Askey, who is the “foundation of the team”, a community that stresses education, and an efficient team structure (Oelke). This paper will discuss the distinguished factors of the NAR to guide other teams in possible improvements, or it can serve as an entertaining read on the fourteen year history of the NAR.

### **2. An Active Sponsor**

When interviewing various alumni, many agreed that Mr. Askey was a vital asset to the success of the team. Mr Askey has been the sponsor of NAR since its birth in 2000; past and present Botball members agree that without his “...coaching, and centralized fund raising, there wouldn’t be any plaques up on the wall” (Nitzov). Nils Schlupp adds that Mr. Askey is “...very important. He made sure we could focus on building the best robots and not worry about anything else.” Without Askey’s Hands-off approach, funding from alumni, and the continuation of the Botball culture, NAR’s success would be nonexistent.

#### **2.1. Hands-off**

Mr. Askey considers himself to have a “laissez-faire attitude” when it comes to his sponsorship to the NAR (Askey). Although, that wasn’t always the case. The first two years of Botball, Mr. Askey would build and program with the students. Until a student pulled him aside and told him that he wasn’t “suppose to be doing that” (Askey). Askey then realized the sponsor “isn’t suppose to write one line of code or put two legos together”, so from then on he has “done a hands-off approach” (Askey). Many alumni agree that Mr. Askey’s laissez-faire attitude is critical to the success of the team. His ability to “manage the team” but not “get involved” forced the team to solve “problems instead of just getting the answer” (Cotrone). Tim Ashley agrees and says that Mr. Askey “did an excellent job of balancing how hands-off/hands-on he was with [the] team.” Ashley believes that “members of the team” should “struggle and learn on their own”, and that it hurts teams with overly-active sponsors during competitions since the teams “do not know how to critically think for themselves.” Askey emphasizes the need

for independent thinking and mentions that it's not only about "the talent of students, but putting those talented students in leadership positions, and giving them the freedom." The non-interference attitude of a sponsor is highly beneficial when it comes to competition day, and it forces students to "struggle through a problem themselves in order to develop the critical thinking skills necessary to be successful" (Ashley).

## 2.2. Funding

Even though Askey remains hands-off with the building and programming of robots, he is very involved to make sure Botball has adequate funding and resources. Jeff Terry says that a huge factor to the success of the NAR is that they "always had the pieces [they] needed, when [they] needed them." Many alumni speak gratefully that "Mr.



Askey was fighting the politics...of getting sponsorship/donations/fundraising such that [they] were not burdened with items that would slow [them] down..." (Ashley).

Askey acquires these funds by asking alumni for donations and by organizing events such as the concession stand at regional tournaments. Zach White recalls that Askey always provided a "practice table and [made] sure there were plenty of kits for experimentation." With Askey's activity in funding and resources, the NAR is able to focus solely on building and delivering their finest robot when it comes to competition day.

Figure 1: David Askey at the concession stand raising money for the annual GCER trip.

## 2.3. Culture

Throughout the years, Askey has fostered the Botball culture that has thrived at Norman High. Askey believes that providing "food, foosball, and entertainment...is important", and he tries to "make it a way of life" (Askey). Jan Schlupp recalls how "Mr. Askey integrated a culture of fun and enjoyment" which made it easier to "work hard" because "they really [enjoyed] it." NAR alumni spoke very highly of the Botball culture at Norman High and claimed that "a good culture is probably the most important thing for a Botball team to have", and that culture is "guided by an effective sponsor" (Terry). Also, "having an environment where you can build, prototype, tinker, and test you ideas is a larger portion of the battle than the ideas themselves" (Azma). There is no doubt that Mr. Askey creates a supportive and fun surroundings for the NAR to work. As a result of the supportive Botball culture, many team members are always "impressed with

how much bigger [the] team is when compared to other teams” (Cotrone). Cotrone claims the NAR’s size is “significant because it shows how much the environment (both at school and the team) fostered participation in the team.” The culture Askey brings to the NAR makes him a “critical and irreplaceable” asset to the team (Nitzov).

### **3. Education Driven Environment**

There are many stereotypes that originate in Oklahoma: southern hospitality, rednecks, bible-belt, and low-ranked education. Therefore, it often surprises many that a suburban town in the center of Oklahoma can harbor a successful robotics team. The city of Norman does not fit to the stereotypical mold of Oklahoma. Being a college town, education is often a priority, which then plays a huge role in the environment at the Norman Public Schools. The thriving environment of Norman High School and OU has given the NAR a place to experiment and test their talents.

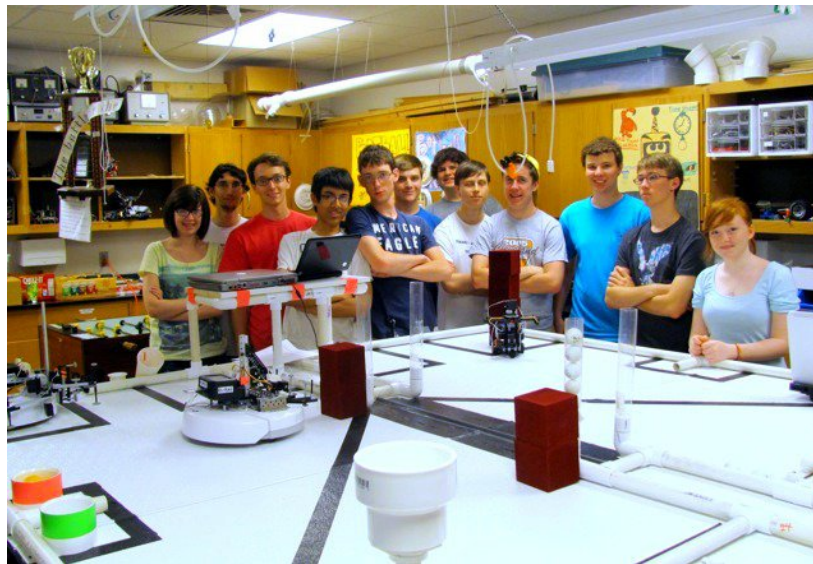
#### **3.1. University of Oklahoma**

Located less than a mile from the high school, the University of Oklahoma, a striving research university prevails, and the institution strongly influences the environment at Norman High, and the city of Norman. Scott Beck, the principle of Norman High, says that “the parents of a lot of [their] students have devoted their entire life...to higher education. So it stands to reason, that you are going to have students that prioritize education.” This results in a “community [that] is going to say yes to education” (Beck). Mr. Askey furthers the importance of OU by claiming that he wouldn’t build a new Botball team “unless there was a... pretty strong university association” (Askey). He stresses the importance of having a resource “of people that do mechanical engineering” (Askey). Norman Public Schools especially strives in various academic areas, which are “driven by the community. Not this outside entity” (Beck). As a result of an educational driven community, NAR has received a lot of support from the Norman Public School system: The Norman Foundation has given thousands of dollars to the team for the last fourteen years, the NHS PTA has always responded to Mr. Askey’s grants, and the Norman High School AP Committee (no longer in existence) gave an estimated \$10,000 over the years. Norman North, the other high school that takes part in the NAR, has donated around \$4,000 the last few years. Due to educational-driven environment, the NAR receives moral and financial support. Even though it’s improbable for every botball team to acquire a university next door, many could be inspired by visiting nearby engineering companies factories, community colleges, and higher educational institutions. It would also be beneficial to build a relationship with establishments for resources, connections, and incentives.

#### **3.2. NHS**

Norman High School has always had a high standard of excellence. The school of 1,945 students has above average test-scores and excels in the amount of merit

scholars annually. In years where the NAR was particularly successful (2005, 2006, 2011, 2012, and 2013), NHS always had higher than average ACT and SAT scores when compared to both the State and National averages. In 2005 and 2006, when the NAR placed first at NCER, the ACT score of NHS was 2.1 points higher than the national average (NHS 2005-2006; NHS 2010-2011). Norman high also fostered ten merit scholars in 2005 and six in 2006. The talent present at the school and in the NAR is an important factor of the NAR's success but "the environment has to foster that talent" (Askey).



Norman High School is "the product of what the community brings" and that is a "community that values education" (Beck). The environment that surrounds Norman High and the rest of Norman Public

Figure 2: Botball 2011: Jeremy Rand, Garrett Sickles (leader), Marshall Parker, Kevin Cotrone, Marty Rand, Jeff Terry, Daniel Gorree, Rhea Kickham

Schools has had a huge influence on the success of the NAR. From 2011-2013, NAR placed at GCER. The ACT average remained two points above the national average, while the SAT was 50-150 points higher in each category. Many other academic areas thrive at Norman High: NHS is currently the state champions in Speech/Debate -while many have placed at nationals, this year they won first place nationally for their yearbook and online newspaper, they were selectively picked to run the AP capstone program, over fifty students are selected in fine-arts all-state annually, over ten in athletics, and Norman High fosters at least one academic all-state every year. Those are just a few of Norman High's many accomplishments: along with the the top orchestra winning state-sweep states with accent almost every year of its existence (this year band and choir too), harboring a top twenty debate school in the country, two to five students becoming AP scholars each year, and much more. There is without a doubt that Norman High is a place of excellence that would champion a thriving Botball team. However, many schools do not have the same opportunities presented at Norman High, but there are ways to improve any school's community. Introducing an AP curriculum to students is an excellent way for them to strive academically. Furthermore, funding the arts is proven to heighten the value of a community and will contribute to a well-rounded school. If the students are submerged in an environment that nurtures their needs as well

as pushes them, academics will improve which will trickle down to improved programs. Therefore, the Botball team could be affected.

### **3.3. Middle school teams**

Middle school Botball teams have allowed Norman students to grasp the basics of robotics before joining the high school team. Askey says he's like the "Barry Switzer of Botball" because he "inherits a lot of talent" This is because students joining the team are "already trained up, or there are other members on the team that can train the new students" (Askey). The middle school teams allow Askey to "more of a hands off approach"(Askey), which is critical in a successful high school team. In 2009 a Norman middle school team was first middle school to win GCER. These legends then joined the NAR and continued the high standards that were set for the team. This reveals how vital feeder school are to the success of high school teams. Askey gives almost all credit to the "middle school sponsors" because "they do all the groundwork" (Askey). Starting programs in feeder schools is a magnificent way to eventually improve a Botball team.

## **4. Team Organization**

The organization of the NAR and the combination of talented individuals, "knowledge and...motivation" has contributed to the NAR's prosperity (Cotrone). While legacies and the competitive nature of the NAR enables the team to flourish.

### **4.1. Open Code**

An important aspect of the NAR is the legacy left by older members. Open code, a library of efficient tricks and shortcuts to help program a robot, was first created by Garrett Sickles and Kevin Cotrone in 2012. Ever since then, it has been a treasured part of NAR. Open code has proven valuable as it has drastically simplified the programming process, while also creating the possibility to "make large code changes...in a short amount of time" (White). Open code can be attributed to the team's success as it "made it much easier for the team to program robots efficiently" (Grady). This program has also been shared with other teams for their use, since this is a creation that Sickles and Cotrone felt should be shared with the entire Botball community.

### **4.2. Large team size creates competition within team**

At the start of a new season, Mr. Askey reminds the NAR that "the best builders know a little programming, and the best programmers know a little building" (Askey). This advice has led to the NAR dividing into small teams that "get behind a robot together" (Oelke). This system works well because of the large size of the NAR. Everyone on the team trusts "each other well enough to believe each individual would make intelligent decisions" allowing the small group to work independently before reuniting behind the

“most successful design” a few months before the competitions (Oelke). Since many members of the NAR thrive on competition, this often results in two teams “working on the same strategy.” Members would split into “groups of 2-3 people to work on each robot.” The competition between the small groups leads to “result-driven thinking” and more productivity (Terry). Arya Azma, a former team member says “Smart people will go to great lengths to prove their ideas to other smart people”. Therefore only the best designs will be used at the regional and national competitions. Friendly competition leads to better quality work and strong robots.

## **5. Does this work for other teams?**

The NAR has proven that their strategies work for their team, but there are organizational differences in other successful teams. HTL Donaustadt, a team from Austria, is also known to be prosperous at GCER, but they differ from the NAR team size and the division of responsibilities. The NAR has a much bigger team throughout the season, even though, in the summer, the number typically decreases as the truly motivated students stay. These students typically still work in small groups and share the tasks of programming and building the bots. On the other hand, HTL Donaustadt has very defined roles. Felix Krause, a former member of HTL Donaustadt, explains that “one team member was only programming, while one was mostly constructing and organizing things”. Since their team size is much smaller than that of the NAR, there isn’t any competition between the members. In the past year there were three members, all of whom were smart and dedicated individuals who worked well together. As all three of the students were in the same grade, which resulted in no seniority; it was about “how willing the person was to spend his free time for robotics” (Krause). This is unlike the NAR who has definite seniority. However, the teams do share similarities: both sponsors use a laid back approach with their students. Krause states that his sponsor was there “only financially to afford the robotic kit” allowing the students to work through problems on their own and create award winning robots. Even though the NAR and HTL Donaustadt have defined differences, both teams are often successful at tournaments. They both share similarities that appear to be vital factors to the success of a Botball team.

## **6. Star students/legacies**

Much of the NAR’s success is due to the “Botball legends” that have passed through Norman High. Although there have been many brilliant minds that have been part of the NAR, a couple standout to have truly excelled the team: John Romanishin, Jeff Terry, and Garrett Sickles.

### **6.1. John Rom**

John Rom could very well be the most favored member of the NAR. In fact, Jan Schlupp says “a successful team requires at least one brilliant mind like John Rom to be a national championship contender.” John joined the NAR in 2004 as a freshman, and in 2005 and 2006, and he was a huge factor in NAR winning NCER. He initially joined Botball because “it seemed like the perfect excuse to keep playing with legos as [he]

got older”, and he became part of the Alcott Middle School team (Romanishin). He soon thrived in all aspects of Botball, especially his robot designs. Askey recalls the “Alcott sponsor telling [him] that [John] would put Norman High School on the map.”



The team felt like “that they could beat any team anywhere anytime as long as they had John.” (Askey). However, when you meet John, he “is very humble. Very introspective. He was not just interested in Botball. He was a hell of a debater, great in

Figure 3: 2005 (Cocoa Beach, Florida) the day after winning the national championship. From left to right: Zach Morris , Brenna Wallach, Trey Gaylord , Martin Oelke, John Romanishin, Jorge Villatoro, Zac White, Yemi Harris, Nathan Ashley (Tim Ashley not pictured for some reason) David Askey’s two sons, (Jacob and Evan) are in front)

Aegis English, [and] AP Government” (Askey). Arya Azma, a team member of John’s says that “John Rom” is a notable quality of the NAR. John currently studies at MIT, where even they “show him off” (Azma), and he is currently working on developing M-Blocks.

## 6.2. Jeff Terry

Jeff began his Botball career by joining Alcott Middle School’s Botball team because he “thought building Lego robots that moved sounded pretty awesome” (Terry). By eighth grade, 2009, Jeff Terry carried the team consisting of him, Ben Parker, and Daniel Goree, to GCER where they won best overall and first in DE. To this day they are the only middle school to win GCER. Although, that was just the beginning of Jeff’s legacy to the NAR. In 2011 the NAR won third overall and third in seeding, and in 2012 and 2013 the NAR won 2nd overall, 1st in DE, and 3rd in seeding. Jeff was very involved in the team and would spend “...hours outside of meetings writing code for [robots]” (Jeff). Even though Jeff was one of the top programmers on the team, he says that his biggest strength was his “ability to come up with effective strategies.” Although, Jeff doesn’t take much of the credit for the team’s success, he gives a lot of recognition

to Garrett Sickles, a team member one year ahead of himself. Jeff claims that “Garrett’s buildings philosophy and robot designs had a major effect on [his] thinking when [he] came to Norman High.” He adds that by working closely with Garrett “he learned the most about building robots.” Jeff also states that “other team members were very involved” during his years in Botball, and he gives a lot of credit to Alex Spens for excelling at building robots. When interviewing Alex, he had only positive words about Jeff. According to him, Jeff could “program better than full time programmers”, and Jeff “never failed to deliver” with the “large portion of work” he took on for competitions. Even though Jeff disagrees with the fact that some might consider him a legend, Alex says that “Jeff is definitely a Botball legend” and “If he had to choose one person to be on a Botball team with, it would be Jeff.” Graduating as a Merit Scholar, Jeff is now a Sophomore at OU majoring in computer science with minors in math, physics, and psychology. He says the things he will take away from his Botball experience is “problem-solving skills” and “that in order to do something, you have to do it.”

### **6.3. Garrett Sickles**

Garrett Sickles joined the Alcott Middle School Botball team in the sixth grade because he “thought [he’d] be good at it”, and without a doubt, Garrett was (Sickles). He started out as a builder, but “soon discovered programming was much more important in the long run. He “learned to program in 8th grade at Alcott” (Sickles). When Garrett came to Norman High, he revealed great leadership qualities, which was an important skill he brought to the NAR. Alex Spens, a teammate of Garrett’s, says that Garrett “kept us all organized and on task, providing final decisions to tough challenges” (Spens). Like all legends, Garrett also excelled in building robots. Alex calls him a “...phenomenal builder, famous for building parallel arms” (Spens). Garrett currently studies at Colorado School of Mines; double majoring in geophysical engineering and computer science.

## **7. Teaching the younger members**

Daniel Goree describes the NAR as a “oligarchy” that was controlled by the “top students” and where the younger members aren’t seen as vital to the team. The team’s success at tournaments waxes and wanes with the coming and going of legacies such as John Rom and Jeff Terry. Something the NAR lacks is its capabilities to train younger members to make sure they “have the knowledge to succeed in future competitions” (Grady). The success of a team depends on older, more experienced members incorporating “new members and [teaching] them” (Cotrone). By training “newcomers before the season starts” assures that “they are not overwhelmed when the season kicks into full gear” (Terry). Therefore they can contribute more to the team when they become the oldest and top students. This is something the NAR still struggles to do. It explains why the NAR isn’t

consistently on the map, since the younger members need time to learn the basics of Botball that the “top students” fail to pass on.

## **Conclusion**

There are many factors that subsidize the NAR. Even though the team isn't perfect, one could still take away from the qualities that has brought the team its success. Some factors are innate such as the university association or John Rom, but an exceptional sponsor and a cherished culture are some that can be more easily obtained. Also re-organizing the team structure in a more effective manner, not necessarily correlating the NAR, can heighten the productivity of a team. There are various ways to improve a Botball team, this is just the prescription for the NAR.

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